Master's Programme in

Electric Power Engineering

Our global demands of affordable and sustainable resources for an improving world have placed an urgent need on electrical engineers and researchers. Both to provide electricity and to build new smart solutions that enable a more sustainable energy management. This programme is designed for you who would like to work within the areas of: management, systems and/or components within electric power engineering.

The Electric Power Engineering Programme is taught in English in the following areas:

- electric power systems and markets
- power system operation control and automation
- power electronics and drives
- modelling of electrotechnical equipment
- management of power systems

YEAR 1

In the first year, the programme is focused on providing a good solid understanding of the electric power engineering domain as a whole. The programme starts with fundamental courses in the area during the first half year, courses that will constitute the basis for further specialisations later in the programme. In addition, the first year also includes technology complementary courses that provide environmental, societal, and philosophical perspectives to electric power engineering.

YEAR 2

The second year (and also the end of the first year) is devoted to specialisation within the

field. The programme offers a wide range of courses on various topics in the areas of electrotechnical design, electric energy conversion, power system design, and control of power systems. The second year includes a mandatory project course as well as the final master thesis project.

MASTER'S DEGREE PROJECT

The final degree project corresponds to five months' full-time studies and is examined at KTH in the last term of studies. It can be undertaken at the university or in industry, anywhere in the world. Degree projects undertaken at the university are part of ongoing research and provide the opportunity to build close contacts with a research group. Projects in collaboration with industrial partners are often related to research and development. The project must be presented in written form, as the master's thesis, and also orally in a seminar.

Examples of degree projects made by former students

Gaülle Ryckebusch: " Analysis of Demand-Response Participation Strategies for Congestion Management in an Island Distribution Network". Project done together with Vattenfall as a part of the Smartgrid Gotland project. Gaelle is now working at Vattenfall Research & Development.

Fabian Hohn: "Development of a Directional Definite-Time Overcurrent and Earth Fault Protection based on COTS Components". The project was done together with ABB Substation Automation Products, and Fabian is now continuing his work as a Ph.D. student at KTH in a European project on protection of HVDC grids.

Emil Fjällström: "Impact of Converter Modulation Strategies on the Losses in a Traction Motor". The project was done in collaboration with Bombardier and studied possible strategies to reduce losses in converters for traction motors.

Rokibul Hasan: "Development, calibration and simulation of generic VSC-HVDC high level controls for DC grid Simulation". The project was conducted at KTH as a part in a larger effort to develop models useful for real-time simulation of HVDC grids.

CAREER

For decades, KTH and Sweden have been at the forefront of advancements in grid systems, power component technologies and automation solutions. These areas are in constant need of fresh ideas and new engineers. For a long time there has been a wide selection of career options all over the world for electric power engineers.

This programme is designed to utilise KTH's strong ties with research and industry leaders such as ABB, Vattenfall, Ellevio, Bombardier and the European Institute of Innovation and Technology, offering students an excellent opportunity to apply their knowledge in practical, industrial applications.

COURSES

The program consists of five blocks of courses and a thesis project. The blocks are: mandatory courses, three groups of conditionally ective courses, from each such group of courses have a minimum number of credits should be consulted to get your degree, and finally a block of freely elective courses.

1. Compulsory courses: EH2220, AK2030, all courses must be passed to certify for the degree. For students following the program but not studying at KTH for two years, e.g. due to studies abroad, EH2220 is replaced by EH2221.

2. Basic power engineering (conditionally

CONTACT

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elective - group 1): EG2100, EG2200, EH2741, EI2436, EJ2301 EJ2201. Of these, at least 24 credits must be passed for to certify for the degree. It is free to take the courses either year 1 or year 2. However, please note that these are often the entry requirements for courses in Conditionally Elective - of group 2.

3. Advanced power engineering (conditionally elective - group 2): EG2110, EG2120, EG2210, EG2220, EG2340, EG2420, EH2745, EI2402, EI2405, EI2430, EI2433, EI2437, EI2439, EI2440, EI2452, EI2455, EI2490, EJ2222, EJ2230, EJ2311, EJ2420, EJ2440, EL2820, EL2520, EL2620, EL2720, EL2450, EL2700, EL2820. Of these, at least 22,5 credits must be passed to certify for the degree. It is free to read the courses either year 1 or 2, so long as the necessary prerequisites are met.

4. Project courses in power engineering (conditionally elective - group 3): EI2520, EH2720 of which at least 7,5 credits must be passed to certify for the degree.

5. Freely elective courses (recommendations): EQ2870, EP2120, EP2500, EP2510, SF2812, SF2822, EH2770, EH2030, ME2043, EL1150, MJ2411, MJ2410, DD2431, DD2425, IK2218

		YEAR	CREDITS	1	2	3	4
MANDATORY							
EH2220	The Sustainable ... Engineer	1-2	3.0	x	x	x	x
AK2030	Theory and Methodology oF Sci.	1	4.5			x	
	Master thesis	2	30				
CONDITIONALLY ELECTIVE							
EL2700	Model Predictive Control	1	7.5	x			
EL2820	Modelling of Dynamical Systems	1	7.5	x			
CONDITIONALLY ELECTIVE BASIC COURSE							
EG2100	Power System Analysis	1	6.0	x	x		
EG2200	Power Generation Operation and Planning	1	6.0	x	x		
EH2741	Communication and Control in Electric Power Systems	1	6.0			x	
EI2436	Power Grid Technology and Substation Design	1	6.0	x	x		
EJ2201	Electrical Machines and Drives	1	6.0	x	x		
EJ2301	Power Electronics	1	6.0	x	x		
CONDITIONALLY ELECTIVE ADVANCED COURSE							
EI2455	Smart Electrical Networks and Systems	1	7.5	x	x	x	x
EJ2420	Seminars in Electrical Machines and Power Electronics	1	1.5	x	x	x	x
EI2433	Electrotechnical Modelling	1	7.5		x		
EG2110	Power System Stability and Control	1	7.5			x	
EG2210	Electricity Market Analysis	1	7.5			x	
EI2440	Electrotechnical Design	1	7.5			x	
EJ2311	Modulation of Power Electronic Converters	1	6.0			x	
EL2450	Hybrid and Embedded Control Systems	1	7.5			x	
EG2220	Power Generation, Environment and Markets	1	7.5				x
EH2745	Computer Applications in Power Systems	1	4.5				x
EI2430	High-voltage Engineering	1	7.5				x
EI2452	Reliability Evaluation of Electrical Power Systems	1	7.5				x

		YEAR	CREDITS	1	2	3	4
EJ2230	Control in Electrical Energy Conversion	1	6.0				x
EJ2440	Electric Transportation	1	6.0				x
EI2402	Electromagnetic compatibility	2	7.5	x			
EI2405	Classical Electrodynamics	2	7.5		x		
EI2439	Power System Protection	2	6.0	x	x		
EI2490	Seminar Cou. in Electrotechnical Design and High Vol. Equipment	2	1.5			x	x
EJ2222	Design of Electrical Machines	2	7.5	x			
EL2620	Nonlinear Control	2	7.5		x		
EJ2420	Seminars in Electrical Machines and Power Electronics	1-2	1.5	x	x	x	x
EG2340	Wind Power Systems	2	7.5	x	x		
EG2420	Monte Carlo Simulation Theory and Project	2	7.5	x	x		
CONDITIONALLY ELECTIVE PROJECT COURSE							
EI2520	Project in Electric Power Engineering	2	9.0	x	x		
EH2720	Management of Projects	2	7.5	x			