Programme syllabus

An accessible version of the syllabus can be found in the Course and programme directory.

Degree Programme in Electrical Engineering 300 credits

Civilingenjörsutbildning i elektroteknik

Valid for students admitted to the education from autumn 15 (HT - Autumn term; VT - Spring term).

This is a translation of the Swedish, legally binding, programme syllabus.

Programme objectives

For a Master's Degree in Electrical Engineering, a student must fulfill the goals that are specified in the Swedish Higher Education degree ordinance for a Master of Science degree in engineering (civilingenjör).

The programme's aim

Studies in Electrical Engineering are comprised of basic mathematics, natural science and their technical applications. The study programme offers a broad knowledge base which can be applied in widely varying fields.

Knowledge and understanding

An engineer graduating from the Degree Programme in Electrical Engineering must

1. have knowledge of the scientific foundation of electrical engineering and proven experience.

2. be able to apply a creative and critical work approach in order to, within a given framework, formulate and solve problems with adequate methods and tools.

3. be able to analyze electrical engineering problems through a systems perspective, with a holistic viewpoint of technical systems and their lifecycles; from the idea and needs to specifications, development, manufacturing, operation and decommissioning processes.

4. exhibit the insight that problem-solving takes its point of departure in needs and functionality, with consideration to business conditions, environment and society.

Skills and abilities

An engineer graduating from the Degree Programme in Electrical Engineering must

5. have the ability to independently apply mathematics and science within the discipline of electrical engineering.

6. have mastered and be able to independently apply significant relationships within electrical engineering as well as to be able to formulate, analyze and solve complex electrical engineering problems.

7. be able to analyse technical problems from a systems perspective from the idea/need through its specification, development, manufacturing and operation.

8. exhibit ample ability in engineering-related contexts to be able to communicate verbally and in writing with different target groups in Swedish and English, and to be able to discuss the conclusions as well as knowledgeably support the basis for such conclusions.

9. exhibit the ability to co-operate, plan, lead and organize.

10. be able to follow and utilize developments in knowledge within electrical engineering and to be aware of the primary features of current research and development in the field of technology

Ability to make judgements and adopt a standpoint

An engineer graduating from the Degree Programme in Electrical Engineering must

11. exhibit insight into the possibilities and limitations of technology, its role in society, and the responsibility of mankind for how it is used nationally and internationally.

12. exhibit an understanding of and respect for the significance of how electrical engineering affects people, society in general, and the environment with respect to limited natural resources.

13. exhibit an awareness of the ethical aspects of research and development work.

KTH's local degree ordinance

The goal of the Master of Science of Engineering Degree is to create and develop the engineering competency that is needed in order to effectively and efficiently exploit technology in the service of both the individual as well as society in general. A Master of Science in Engineering Degree is awarded after the educational programme has been completed. Programmes must be designed so that students, upon receiving the degree, have fulfilled the national requirements for the degree and completed courses totalling 300 credits.

All information about the degree requirements for the Master of Science in Engineering degree, student Bachelor's Degree, and respective masters degrees can be found in KTHs local degree ordinance.

http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina/1.27227

Extent and content of the programme

The Master of Science in Engineering programme in Electrical Engineering consists of 300 credits, which at normal study speed corresponds to five years of full time study. The programme's first three years are in the first cycle and can be concluded with a technology Bachelor's Degree, if the student applies to do so. The last two years are concluded in the second cycle and can be concluded with a technology Master's Degree.

The first three years of the programme are mainly in Swedish, with certain English literature included. The last 2 years are mainly in English.

Students in the Electrical engineering program have a guaranteed place in the following KTH´s master´s programs:

- Electrophysics
- Electric Power Engineering
- Embedded Systems
- Medical Engineering
- Nano Technology
- Network Services and Systems
- Systems, Control and Robotics
- Engineering Physics
- Wireless Systems

Students can also apply for International Programs, but admission is not guaranteed. These programs are:

- Energy Innovation: Track SENS
- ICT Innovation: Track Digital Media Technology, Track Embedded Systems, Track Internet Technology and Architecture
- Research on Information and an Communication Technologies (Merit) (This programme has no new admission).

All these master's programme will give a degree in Electrical Engineering.

Eligibility and selection

For selection methods, see KTH's admission policy,

http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/antagning/1.27186

Eligibility

General eligibility for university studies in Sweden, i.e. completed upper secondary education including documented proficiency in Swedish corresponding to Swedish 3 / Swedish as second language 3 and English corresponding to English 6. In addition, specific requirements of mathematics, physics and chemistry corresponding to Mathematics 4, Physics 2 and Chemistry 1.

A proportion of students admitted to the program will be admitted on the basis of results from a voluntary Mathematics and Physics test.

www.matematik-och-fysikprovet.se.

Implementation of the education

Structure of the education

The study year for KTH's education is divided into four periods. Every study period is followed by an exam period. For details about the structure of the academic year, see KTH student web.

The program for Electrical Engineering during the first three years consists mainly of compulsory courses in mathematics, electrical systems and physics. The fourth year, the student chooses from several available specialisations in conjunction with a Master's program. By following one of these programs, the student will be eligible for both a degree in Electrical Engineering and also a Master's degree in the chosen specialty.

The study programme is designed so that after 3 years, it is possible to acquire a Bachelor degree in order to, if desired, continue studies in another program at KTH (other than the suggested specializations) at another University in Sweden, abroad, or else to pursue a career.

Courses

The programme is course-based. Lists of courses are included in appendix 1.

The programme is composed of compulsory, conditionally elective and elective courses. The compulsory, conditionally elective and recommended elective courses are defined for every study year and specialization in the teaching and time schedule. The goals, prerequisites, contents and examination requirements for each course can be found in the Course and Program Directory on the KTH student web.

Grading system

Courses in the first and the second cycle are graded on a scale from A to F. A-E are passing grades, A is the highest grade. The grades pass (P) and fail (F) are used for courses under certain circumstances.

Since the grading systems differ very much between different countries, the grades from studies abroad will not be transferred to the KTH grading system.

Conditions for participation in the programme

Registration for the term

All students accepted to a programme must register for each term they intend to actively pursue studies. For newly admitted students this is done in connection with the compulsory registration meeting at beginning of term. For all following terms of the program, the student enters the registration for the term via their Personal Menu at www.kth.se. This registration is necessary for reporting of results and required so that student's stipend (studiemedel) can be disbursed by CSN.

Course Selection

Courses for the coming term must be selected via antagning.se, which is open

- May 1-15th for the fall term
- November 1-15th for the spring term

Course registration

Prerequisites for course registration are selection and eligibility. Each student must register for all courses for the term via Personal Menu. This should be done before the first scheduled lecture. If the student later decides not to take a course, the course registration must be removed via Personal Menu. If the student decides not to take a course more than three weeks after it starts, the course administrator should be notified.

Conditions for being promoted to the next level

For studies in study year 2:

At least 45 credits from study year 1 must be completed by August in study year 2.

For studies in study year 3:

At least 90 credits from years 1-2 must be completed by August in study year 3 (of which at least 50 credits from year 1).

For studies in study year 4:

Total 150 credits from year 1, year 2 and year 3 of which 110 in year 1 and 2 and a completed Bachelor's degreework.

Recognition of previous academic studies

According to the Swedish Higher Education Ordinance, a student who has gone through certain first-cycle study courses and study programmes with a passing result has the right to have such credit recognised for a corresponding course of education at another institution of higher education. The Director of Undergraduate Studies (Grundutbildningsansvarig) at the School of Electrical Engineering will make the decisions concerning recognition of entire courses. Awards of credits for parts of courses may be decided upon by an examiner.

The application for recognition should be submitted to the programme office using the form intended for that purpose.

For further information on recognition of previous academic studies, see the KTH:s regelverk

http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/prestationer/1.27200

Studies abroad

KTH has agreements with over 250 universities around the entire world, providing possible opportunities to study abroad. Exchange studies involve a student exchanging part of their time at KTH for time at another university abroad, with this normally being done during the third or fourth academic years. The last day to apply is around the middle of January and the selections are based upon the results of the earlier studies at KTH.

For further information on studies abroad

https://www.kth.se/en/student/program/utlandsstudier/studera-utomlands-1.4370?programme=f

Degree project

The degree project consists of 30 credits. A major part of the programme studies, at least 240 credits, must have been completed, with a maximum of two foundation courses remaining uncompleted before the degree project is commenced. The degree project may be performed individually or together with another student and the subject must normally be an in-depth study within the area of technology for which the degree is being prepared. The degree project is graded according to the A-F scale, using the three bases for assessment common to all grading at KTH: the engineering and scientific content, the process, and the presentation.

Degree

After the educational programme has been completed the student can apply for three degrees if the qualification requirements are fulfilled:

1) "Degree of Bachelor of Science"

2) "Master of Engineering – Degree Programme in Electrical Engineering".

3) "Masters degree of Science"

KTH's local degree ordinance can be found in its entirety in the KTH:s regelverk:

http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina/lokala-foreskrifter-for-examina-pa-grundniva-och-avancerad-niva-lokal-examensordning-1.27227

Appendix 1 - Course list
Appendix 2 - Programme syllabus descriptions

Appendix 1: Course list

Degree Programme in Electrical Engineering (CELTE)

General courses

Year 1

Mandatory courses (64.5 Credits)

Code	Name	Credits	Edu. level
DD1316	Programming Techniques and C	6.0 hp	First cycle
EH1010	Project Course in Electrical Engineering	7.5 hp	First cycle
EH1110	Global Impact of Electrical Engineering	7.5 hp	First cycle
EI1110	Electrical Circuit Analysis, Extended Course	9.0 hp	First cycle
EP1200	Introduction to Computing Systems Engineering	6.0 hp	First cycle
IE1205	Digital Design	6.0 hp	First cycle
SF1624	Algebra and Geometry	7.5 hp	First cycle
SF1625	Calculus in One Variable	7.5 hp	First cycle
SF1626	Calculus in Several Variables	7.5 hp	First cycle

Optional courses

Code	Name	Credits	Edu. level
EL1150	Introductory Matlab Course *valfri*	1.5 hp	First cycle

Recommended courses

Code	Name	Credits	Edu. level
SD1105	Matlab	3.0 hp	First cycle

Supplementary information

Information is based upon the curriculum for academic year 2014/2015. Changes may occur.

Year 2

Mandatory courses (54.0 Credits)

Code	Name	Credits	Edu. level
ED1110	Vector Analysis	4.5 hp	First cycle
EH1110	Global Impact of Electrical Engineering	7.5 hp	First cycle
EI1220	Electromagnetic Theory E	10.5 hp	First cycle
EN1020	Project Course in Electrical Engineering, part II	6.0 hp	First cycle
EQ1110	Continuous Time Signals and Systems	6.0 hp	First cycle
EQ1120	Discrete Time Signals and Systems	6.0 hp	First cycle
IF1603	Classical physics, mechanics and waves	7.5 hp	First cycle
SF1901	Probability Theory and Statistics	6.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD1320	Applied Computer Science	6.0 hp	First cycle
DD1332	Object Oriented Programming	7.5 hp	First cycle
EI1222	Electromagnetic Theory, Continuation Course	6.0 hp	First cycle
EP1100	Data Communications and Computer Networks	7.5 hp	First cycle
IF1614	Thermodynamics and Statistical Physics	7.5 hp	First cycle
SF1546	Numerical Methods, Basic Course	6.0 hp	First cycle
SF1628	Complex Analysis	6.0 hp	First cycle
SF1662	Discrete Mathematics	7.5 hp	First cycle
SF1861	Optimization	6.0 hp	First cycle
SH1012	Modern Physics	8.0 hp	First cycle

Supplementary information

Based on the school year plan for 2014/2015 . Changes can be made for the coming academic year .

The program consists of compulsory courses , conditionally elective courses and elective courses.

When you apply for your bachelor's degree, you should have read 3 conditionally elective courses and one elective course. There is room in the schedule to read two of the courses in the spring in the second year and two in the spring of third year (to be a for full-time student and eligible for student aid, you need to be registered on courses equivalent to 30 credits per semester).

These courses are conditionally elective for grades 2 and 3. Select at least 3 of the following courses for your exam : DD1347, EI1222, EP1100, SF1546, SF1628, SF1662, SF1861, SH1012, DD1320, DD1332, IH1611, DD1388.

Regarding scheduling conflicts: Only compulsory courses is guaranteed not to collide with other compulsory courses.
Conditionally Elective courses are scheduled collision-free when possible. If you take a course which is not listed as a compulsory course in your academic plan, you must yourself (when selecting courses) make sure that it does not clash with other courses that you plan to read.

DD1332 will not be given the academic year 2017-2018.

Year 3

Mandatory courses (52.5 Credits)

Code	Name	Credits	Edu. level
EF112X	Degree Project in Electrical Engineering, First Cycle	15.0 hp	First cycle
EH1110	Global Impact of Electrical Engineering	7.5 hp	First cycle
EJ1200	Electric Power Systems	6.0 hp	First cycle
EK1191	Measurement Technology	6.0 hp	First cycle
EL1000	Automatic Control, General Course	6.0 hp	First cycle
EQ1270	Stochastic Signals and Systems	6.0 hp	First cycle
IE1207	Analog Electronics	6.0 hp	First cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD1320	Applied Computer Science	6.0 hp	First cycle
DD1388	Program System Construction Using C++	7.5 hp	First cycle
EI1222	Electromagnetic Theory, Continuation Course	6.0 hp	First cycle
EP1100	Data Communications and Computer Networks	7.5 hp	First cycle
IH1611	Semiconductor Devices	7.5 hp	First cycle
SF1547	Numerical Methods, Basic Course	6.0 hp	First cycle
SF1628	Complex Analysis	6.0 hp	First cycle
SF1662	Discrete Mathematics	7.5 hp	First cycle
SF1861	Optimization	6.0 hp	First cycle
SH1012	Modern Physics	8.0 hp	First cycle
SK1119	Thermodynamics and Statistical Physics	7.5 hp	First cycle

Appendix 2: Specialisations

Degree Programme in Electrical Engineering (CELTE)

This programme has no specialisations.