



# Programme syllabus

[An accessible version of the syllabus can be found in the Course and programme directory.](#)

## Degree Programme in Electronics and Computer Engineering 180 credits

Högskoleingenjörsutbildning i elektronik och datorteknik

*Valid for students admitted to the education from autumn 14 (HT - Autumn term; VT - Spring term).*

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

### Programme objectives

The purpose of the Degree program in engineering at KTH is to train students for electronic and computer engineering of high international standard to meet society's need for competence for the use and development of technology. Training must be balanced so that the engineer students are well prepared to begin practice in their profession, but also have a good basis for continuing self-development and learning.

For engineering programs in particular, it is necessary to provide knowledge and skills in applied mathematics, basic and applied technical subjects, computer systems and its use and the knowledge and understanding of technology and the general conditions for engineering work.

# Knowledge and understanding

For Bachelor of Science in Engineering, the student shall

- demonstrate knowledge of the scientific basis for computer technology and its proven experience and knowledge of current research and development work and
- demonstrate broad knowledge in the chosen technology and relevant skills in mathematics and science

# Skills and abilities

For Bachelor of Science in engineering, the student shall

- demonstrate the ability to in a holistic way independently and creatively identify, formulate and manage issues and analyze and evaluate various technologies related to information technology,
- demonstrate an ability to plan and use appropriate methods to carry out tasks within a given framework,
- demonstrate an ability to critically and systematically use knowledge and to model, simulate, predict and evaluate events based on relevant information,
- demonstrate an ability to design and manage products, processes and systems with regard to human conditions and needs and society's objectives for economically, socially and ecologically sustainable development,
- demonstrate ability for teamwork and collaboration in groups with different composition and
- demonstrate ability to verbally and in writing, explain and discuss information, problems and solutions in dialogue with different groups.

For a degree from the study programme Electronics and Computer Engineering the student shall

- be able to use methods to design, implement, document and maintain systems integrating both hard- and software and
- have knowledge in adjacent subject fields, like communication and control theory to be able to design embedded systems in this field of application.

# Ability to make judgements and adopt a standpoint

For Bachelor of Science in Engineering, the student shall

- demonstrate an ability to make judgments in the light of relevant scientific, social and ethical aspects,

- demonstrate an understanding of technology capabilities and limitations, its role in society and people's responsibility for its use, including social and economic aspects, environmental and safety aspects, and

- demonstrate an ability to identify their needs for additional knowledge and to continuously develop their skills.

## Extent and content of the programme

The training comprises 3 consecutive academic years and comprises 180 credits.

Education level is first level. The programme is not divided into several exits but there are some elective courses.

The policy at KTH is that the language of education is Swedish at first level and English at second level. Some of the courses at first level can be taught in English depending on the teacher. Literature is often in English, but this varies from year to year. Course materials are mostly in Swedish, but English occurs.

The programme is goal-oriented and there is a clear progress to deeper knowledge into electronics and computer engineering. The students are introduced into project skills early in the programme and this knowledge is strengthened later in the program to finally running a project with external customers in the last year.

## Eligibility and selection

Eligibility and selection is according to KTH admission rules

[http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/antagning?l=en\\_UK](http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/antagning?l=en_UK)

## Implementation of the education

### Structure of the education

Academic year, semesters and other study periods are described at KTH student web site.  
<http://www.kth.se/student/schema/1.1007>

**Common basic courses.** The basic courses common for all engineering programmes at ICT School consists of courses in mathematics, computer programming, computer networks, digital design and computer hardware engineering. These courses will give the students basic knowledge in mathematics and information technology. This basic unit of courses is 75 credit units.

**Programme specific courses.** The courses specific for this programme starts at the end of the first year with electrical circuits and continues the second year with analog electronics, embedded systems, automatic control, signal processing and electronic product development. Programme specific courses in year 1 and 2 is 45 credit units. In the third year there is a thesis work of 15 credit units, 7.5 units elective course and 37.5 credit units mandatory courses.

**Elective courses** is offered to ordinary students with a certain place guarantee and are included in the programmes course list. Optional courses can be other KTH-courses or courses from other universities. Such courses could after request from program responsible teacher be counted in as elective course. The elective courses shall be taken after the student has been adopted to the study programme.

## Courses

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

## 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.

## Conditions for participation in the programme

Course selections and signing up must be actively made by all students intending to study next (following) semester.

This signing up procedure is a basis for registration and tuition basis for decisions on promotion to the following semester. Course Registration is done via a web-based tools “ Studera.nu”. Signing up for fall semester are made by 15 May and for spring semester by 15 November.

Promotion Rules for Bachelor of Science program in Electronic and Computer Science are:

- From year 1 to year 2, 45 credits is needed
- From year 2 to year 3, 90 credits is needed.

Course registration, in course, is done before the third week of the course starting date in order for the notified students to declare that they intend to follow the course.

## Recognition of previous academic studies

A Student who has taken courses at another University can receive credit for the courses in the degree. The courses that shall be accepted cannot overlap a course already studied at KTH. To

replace any compulsory course, documented knowledge to the same extent as for the compulsory course must be presented.

KTH policy for recognition of previous academic studies is available at KTH student web.

[http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/prestationer?!=en\\_UK](http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/prestationer?!=en_UK)

## Studies abroad

To be qualified as a student for exchange studies within an exchange agreement with foreign universities the student have to

- have maximally two unfinished courses as a second year student
- have maximally three unfinished courses as a third year student.

For the selection of programme specific exchange positions the KTH selection rules is valid.

Reference to KTH regulations:

<http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/utbytesstudier/1.27225>

## Degree project

The study programme ends with a 15 credit units degree project. The project can be carried out at a department within KTH, in industry or at another university in Sweden or abroad. In all cases there shall be an examiner at KTH. The degree project has to be accepted and registered at the school before the student starts the project. To start the degree project the student is desirably that the student has passed and finished most of the courses in the programme, minimum 120 credit units is needed to start the degree project. The degree project shall be done within the main topic of the programme and be an extension and/or a deepening regarding academic preference or engineering wise preferences. The degree project is graded in the scale A-F Where grades A-E are passing grade. To fulfill the requirements to pass the degree project the student has to be approved in three grounds of judgement: *process, technological/scientific content and presentation*.

Reference to KTH regulations

[http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examensarbete/overgripande-regler-och-riktlinjer-for-examensarbete-15-hogskolepoang-for-magisterexamen-60-hogskolepoang-samt-betygsattning-av-examensarbete-1.27213?!=en\\_UK](http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examensarbete/overgripande-regler-och-riktlinjer-for-examensarbete-15-hogskolepoang-for-magisterexamen-60-hogskolepoang-samt-betygsattning-av-examensarbete-1.27213?!=en_UK)

## Degree

Requirements for exam is fulfilled when the student have passed all required courses in the programme. The degree is “Bachelor of Science in Engineering”. It is written in the text part of the

degree diploma that the study programme is Electronics and Computer Engineering. The application to receive the degree diploma is sent to the student administration office at the School of Information and Communication Technology.

Reference to KTH regulations

[http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina?l=en\\_UK](http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina?l=en_UK)

Appendix 1 - Course list

Appendix 2 - Programme syllabus descriptions



# Appendix 1: Course list

## Degree Programme in Electronics and Computer Engineering (TIEDB)

### General courses

#### Year 1

#### Mandatory courses (60.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">ID1018</a>	Programming I	7.5 hp	First cycle
<a href="#">IE1204</a>	Digital Design	7.5 hp	First cycle
<a href="#">IF1330</a>	Electrical Principles	7.5 hp	First cycle
<a href="#">II1300</a>	Engineering Skills	7.5 hp	First cycle
<a href="#">IK1203</a>	Networks and Communication	7.5 hp	First cycle
<a href="#">IS1200</a>	Computer Hardware Engineering	7.5 hp	First cycle
<a href="#">IX1303</a>	Algebra and Geometry	7.5 hp	First cycle
<a href="#">IX1304</a>	Calculus	7.5 hp	First cycle

## Optional courses

Code	Name	Credits	Edu. level
<a href="#">II1310</a>	Introduction to Computer Studies	1.5 hp	First cycle
<a href="#">SF1611</a>	Introductory Course in Mathematics I	1.5 hp	First cycle

## Year 2

### Mandatory courses (60.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">HE1038</a>	Control Engineering	7.5 hp	First cycle
<a href="#">ID1020</a>	Algorithms and Data Structures	7.5 hp	First cycle
<a href="#">IE1202</a>	Analog Electronics	7.5 hp	First cycle
<a href="#">IE1332</a>	Electronic Product Development	7.5 hp	First cycle
<a href="#">II1302</a>	Projects and Project Methods	7.5 hp	First cycle
<a href="#">II1303</a>	Signal Processing	7.5 hp	First cycle
<a href="#">IS1300</a>	Embedded Systems	7.5 hp	First cycle
<a href="#">IX1500</a>	Discrete Mathematics	7.5 hp	First cycle

## Year 3

### Mandatory courses (30.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">II1332</a>	Project in Electronics and Computer Engineering	7.5 hp	First cycle
<a href="#">IK1330</a>	Wireless Systems	7.5 hp	First cycle
<a href="#">IL1331</a>	VHDL Design	7.5 hp	First cycle
<a href="#">IX1501</a>	Mathematical Statistics	7.5 hp	First cycle



## Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">AG1815</a>	Sustainable Development, ICT and Innovation	7.5 hp	First cycle
<a href="#">ID1019</a>	Programming II	7.5 hp	First cycle
<a href="#">ID1213</a>	Logic Programming, Basic Course	7.5 hp	First cycle
<a href="#">ID1354</a>	Internet Applications	7.5 hp	First cycle
<a href="#">IF1613</a>	Electromagnetism and Waves	7.5 hp	First cycle
<a href="#">II2302</a>	Sensor Based Systems	7.5 hp	Second cycle
<a href="#">IL2212</a>	Embedded Software	7.5 hp	Second cycle
<a href="#">IS1350</a>	Operating Systems	7.5 hp	First cycle
<a href="#">LS1409</a>	English B1 - Essential Grammar and Vocabulary	7.5 hp	First cycle
<a href="#">ME1003</a>	Industrial Management, Basic Course	6.0 hp	First cycle
<a href="#">SF1626</a>	Calculus in Several Variables	7.5 hp	First cycle

## Supplementary information

Degree Work 15 hp is mandatory during the spring term.



# Appendix 2: Specialisations

## Degree Programme in Electronics and Computer Engineering (TIEDB)

This programme has no specialisations.