



# Programme syllabus

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

## Degree Programme in Chemical Engineering 180 credits

Högskoleingenjörutbildning i kemiteknik

*Valid for students admitted to the education from autumn 17 (HT - Autumn term; VT - Spring term).*

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

### Programme objectives

The Bachelor of Science programme in Chemical Engineering educates students for work on a wide range of chemical and chemical engineering activities.

The study programme has a theoretical and applied profile and the graduates will be able to use and develop new technologies in the chemical and chemical engineering field.

The study programme also aims to provide the students with knowledge about how the technology affects society with respect to the human situation and needs, and goals of society for economic, social and ecologically sustainable development.

In order to comply with the acceleration of technical progress and the changes this brings, the students should have the ability to understand the new technical areas. The student should also be given a good background for continued personal development and life-long learning both within their own focus area and within new subject areas.

The following programme objectives are from the Higher Education Ordinance for a Bachelor of Science in Engineering. They are complemented with additions and clarifications for the Chemical Engineering programme.

## Knowledge and understanding

- demonstrate knowledge of the disciplinary foundation of the engineering field chosen and best practice in this field as well as awareness of current research and development work

- knowledge of physical and chemical processes, different forms of energy and its transformation and the importance of chemical, thermodynamic and kinetic aspects of chemical reaction and process routes
- knowledge of Swedish and international chemical industry

- demonstrate broad knowledge in the engineering field chosen and relevant knowledge of mathematics and the natural sciences

- knowledge of chemical and chemical engineering methods and systems

## Skills and abilities

- demonstrate the ability to identify, formulate and deal with issues autonomously and creatively and to analyse and evaluate technological solutions

- from a complex situation to formulate and organize a task
- to find an appropriate solution to a technical problem
- to compare and evaluate alternative solutions
- assess the reasonableness of the obtained solutions

- demonstrate the ability to plan and using appropriate methods undertake tasks within predetermined parameters

- to solve technical problems with adequate methods
- show good laboratory skills and knowledge on safe handling of chemicals
- have the ability to plan, carry out and evaluate experiments in laboratory scale and in larger scale

-demonstrate the ability to use knowledge critically and systematically to model, simulate, predict and evaluate series of events on the basis of relevant information

- show ability to search and critically examine information
- display skill to make use of computer tools for calculation and information retrieval
- define and combine equations to model natural and technical systems

- demonstrate the ability to design and manage 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

- on the basis of knowledge of chemistry and chemical engineering evaluate a business or product's environmental impact
- select and develop measures to eliminate or limit the harmful effects of an activity or a product
- assess and evaluate technical solutions from the economic and social perspective

- demonstrate the capacity for teamwork and collaboration with various constellations

- to work efficiently in projects

- demonstrate the ability to present and discuss information, problems and solutions in speech and writing and in dialogue with different audiences

- assimilate literature in English and write a report summary in English
- clarify, document and present their work in a technical report
- good language handling and use of subject terminology
- make a sober and clear oral presentation
- receive and give criticism on own and others' work

## Ability to make judgements and adopt a standpoint

- demonstrate the ability to make assessments informed by relevant disciplinary, social and ethical aspects

- reflect on the economic, political and ethical aspects in connection with technical problems and solutions

- demonstrate insight into the possibilities and limitations of technology, its role in society and the responsibility of the individual for how it is used, including social and economic aspects as well as environmental and occupational health and safety aspects

- working safely in the laboratory and in chemical environments and to manage chemicals properly
- strive for recycling and to economize resources

- demonstrate the ability to identify the need for further knowledge and undertake ongoing development of his or her skills

# Extent and content of the programme

Nominal study period is 3 years, which corresponds to 180 credits at basic level.  
The programme is given in Swedish.

## Eligibility and selection

In order to be accepted to the Degree programme, in Chemical Engineering 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 this specific requirements must be met:

### **Upper-secondary school from 1 July 2011 and upper-secondary adult education from 1 July 2012 (Gy2011)**

Field-specific entry requirement A8.

Specific entry requirements: Physics 2, Chemistry 1 and Mathematics 3c. Each subject requires at least a Pass grade.

### **Upper-secondary education before 1 July 2011 and upper-secondary adult education before 1 July 2012**

Field-specific entry requirement 8 \*.

Specific entry requirements: Mathematics D, Physics B, chemistry A. Each subject requires a grade of Pass or 3.

\* For more information about “area of competence”, see [www.hsv.se](http://www.hsv.se)

## Implementation of the education

### Structure of the education

The study year is normally divided into 4 study periods and two or three courses are taken simultaneously at each period. Teaching and examination methods vary between courses. Normally, a proportion of the course is lectures, which gives an introduction with the concepts and theories. Exercises, seminars and laboratory work enhance the understanding of the theoretical relationship. Projects, based on the industrial model, have an essential role in the education. These projects are designed to improve group skills when working with real-life assignments from an engineering point of view.

In order to create a continuity of the program, collaboration between courses within each study year, as well as between study years, is emphasized. The programme is completed by doing a degree project, which is often carried out with a commission outside the school.

The programme's first year is mainly devoted to courses in mathematics and basic chemistry. During the second year, the courses predominately consist of chemistry subjects. The programme's third year consists of advanced courses in chemistry, chemical engineering and environment. The program includes 13,5 credits elective courses in which students can choose to raise their profile. These courses are normally taken during the programme's third years.

## 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

### **Semester registration**

Before every term the student has to register for the programme via the personal menu. Term registration is required in order for you study results to be registered and for CSN to distribute student aid.

The students who have not fulfilled the conditions for advancement must contact the programme coordinator.

### **Conditions for advancement**

For studies in year 2, at least 45 credits from the first year are required. The students, who have not passed the credit limit after the re-exam period in August, must contact the educational coordinator for an individual study plan.

At least 90 credits must be achieved before the start of study year 3. The students, who have not fulfilled this requirement, must contact the programme coordinator for an individual study plan.

### **Course Registration**

Each student should register for the course via the personal menu. Students, who have been registered on a course and then decide not to pursue the course, must notify that immediately to the teacher who is responsible for the course.

It is each student's responsibility to ensure that prerequisites from previous courses are reached before starting a new course. Information about prerequisites is assigned in the respective syllabus.

# Recognition of previous academic studies

The student has the right to transfer course credits from the college/university within or outside the country. The precondition is that the course / courses are of such a nature and has such an extent that they basically correspond to the qualification criteria for the programme. In the case of whole courses, it must be checked by the programme director. Part of a course is checked by the examiner.

## Overlap

Courses that in contents overlap with another or other courses in the programme cannot be counted within the framework of the 300 credits, which is the basis for the degree.

## Studies abroad

Students in the program have the opportunity to study one or two semesters abroad at a foreign institution, which KTH is cooperating with. The students don't need to pay the fees which would otherwise be charged by foreign students. Exchange studies can be done in the third year of the programme. It is also possible to do the Master's thesis abroad.

Information about studying abroad is given by the international coordinators at the student office, which also provide information on current application period. The students can find the application forms at the student office.

After evaluation, the exchange studies can count as part of the programme. The outgoing student must set up a "Learning Agreement" with the programme director, which implies the prior approval of the exchange studies. The studies are normally given in the language spoken in the selected country / region. There are opportunities, for those who are accepted to the exchange programme in German-, French-, Spanish- and Italian-speaking countries, to follow a preparatory language course before the regular semester begins.

## Degree project

The program includes a degree project of 15 credits. That means about 10 weeks of full-time studies;

### *The following apply for the degree project work:*

- It may be started at the earliest after 140 credits are achieved in finished courses and when the final grades are in the relevant courses, which affect the content of the degree project.
- It may be started after the assignment is approved by the programme director
- It is based on the knowledge, which has been acquired during the study time and it is normally carried out during the sixth semester.
- It must constitute proof of an independently, engineering-related work summarizing theoretical and/or experimental work with a corresponding written report and oral presentation.

- It can be carried out at a company or at KTH.

The supervisor and examiner are appointed by the programme director.

## Degree

### *Conditions for the Bachelor of Science in Engineering 180 credits*

To receive a the **Bachelor of Science in Engineering** passing grades, at the lowest P (pass) or E, in all the courses that are included in the student's study plan, are required. The programme is formed so that the student fulfills the national degree requirements and has completed courses corresponding to 180 higher education credits, of which

- mathematical-natural scientific courses of at least 25 credits, and in addition at least 90 credits (including 15 credits of degree project, first level) in the subjects central to the technical area

### *Degree Name*

***Bachelor of Science in Engineering, Chemical Engineering and Technology***

***Högskoleingenjörsexamen, Kemiteknik***

Appendix 1 - Course list

Appendix 2 - Programme syllabus descriptions



# Appendix 1: Course list

## Degree Programme in Chemical Engineering (TIKED)

### General courses

Year 1

#### Mandatory courses (60.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">KH1111</a>	Mathematics	15.0 hp	First cycle
<a href="#">KH1121</a>	Organic Chemistry	9.0 hp	First cycle
<a href="#">KH1122</a>	Analytical Chemistry	7.5 hp	First cycle
<a href="#">KH1123</a>	General Chemistry 1	6.0 hp	First cycle
<a href="#">KH1124</a>	General Chemistry 2	6.0 hp	First cycle
<a href="#">KH1130</a>	Chemical Engineering and Technology 1	7.5 hp	First cycle
<a href="#">KH1150</a>	Engineering Skills	9.0 hp	First cycle

#### Optional courses

Code	Name	Credits	Edu. level
<a href="#">KH0001</a>	Introductory Course in Mathematics	1.5 fup	Pre-university level
<a href="#">KH0002</a>	Introduction to Chemistry	1.5 fup	Pre-university level
<a href="#">KH1406</a>	Swedish Writing for Engineers	7.5 hp	First cycle



## Supplementary information

Study year 1 consists of mandatory courses.

## Year 2

### Mandatory courses (60.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">KH1212</a>	Mathematical Statistics	5.0 hp	First cycle
<a href="#">KH1221</a>	Applied Physical Chemistry	5.0 hp	First cycle
<a href="#">KH1222</a>	Applied Chemistry	5.0 hp	First cycle
<a href="#">KH1223</a>	Biotechnology	7.5 hp	First cycle
<a href="#">KH1231</a>	Chemical Engineering and Technology 2	21.0 hp	First cycle
<a href="#">KH1242</a>	Sustainable Development and the Chemical Engineer	6.0 hp	First cycle
<a href="#">KH1251</a>	Electrical Measurements, Control Theory and Practice	6.0 hp	First cycle
<a href="#">KH1252</a>	Business Administration	4.5 hp	First cycle

### Optional courses

Code	Name	Credits	Edu. level
<a href="#">KH1406</a>	Swedish Writing for Engineers <i>Continues fr�am study year 1.</i>	7.5 hp	First cycle
<a href="#">KH1407</a>	Practical Training for the Degree Programme in Chemical Engineering	7.5 hp	First cycle

## Supplementary information

Study year 2 consists of mandatory courses.

## Year 3

### Mandatory courses (46.5 Credits)

Code	Name	Credits	Edu. level
<a href="#">KH1324</a>	Analytical Chemistry 2	7.5 hp	First cycle
<a href="#">KH1332</a>	Chemical Engineering and Technology 3	9.0 hp	First cycle
<a href="#">KH1341</a>	Environmental Technology	7.5 hp	First cycle
<a href="#">KH1353</a>	Organisational Development and Leadership for Engineers	7.5 hp	First cycle
<a href="#">KH138X</a>	Degree Project in Chemical Engineering and Technology, First Cycle	15.0 hp	First cycle

### Optional courses

Code	Name	Credits	Edu. level
<a href="#">BB1160</a>	Eucaryotic Cell Biology	7.5 hp	First cycle
<a href="#">BB1190</a>	Gene Technology	7.5 hp	First cycle
<a href="#">BB1210</a>	Purification of Biomolecules	6.0 hp	First cycle
<a href="#">KA1015</a>	Chemistry for Sustainable Development	6.0 hp	First cycle
<a href="#">KE2010</a>	Industrial Energy Processes	7.5 hp	Second cycle
<a href="#">KE2070</a>	Transport Phenomena, Advanced Course	7.5 hp	Second cycle
<a href="#">KE2110</a>	Applied Electrochemistry	7.5 hp	Second cycle
<a href="#">KE2130</a>	Renewable Fuel Production Processes	7.5 hp	Second cycle
<a href="#">KE2351</a>	Risk Analysis and Management for Chemical Engineers	7.5 hp	Second cycle
<a href="#">KF1165</a>	Materials Chemistry and Properties	9.0 hp	First cycle
<a href="#">KH1406</a>	Swedish Writing for Engineers <i>Continues från study year 1 and 2.</i>	7.5 hp	First cycle
<a href="#">KH1407</a>	Practical Training for the Degree Programme in Chemical Engineering	7.5 hp	First cycle
<a href="#">KH1408</a>	Spectroscopic Methods in Organic Chemistry	7.5 hp	First cycle
<a href="#">SF1518</a>	Numerical Methods and Basic Programming	9.0 hp	First cycle

## Supplementary information

Study year 3 consists of mandatory courses and elective courses (13,5 hp). Study year 3 ends with a degree project 15 credits.

The course SF1518 Numerical Methods and Basic Programming 9 credits is recommended for students who intend to pursue further studies at one of the masters programme that the School of Chemical Science provides.



# Appendix 2: Specialisations

## Degree Programme in Chemical Engineering (TIKED)

This programme has no specialisations.