Programme syllabus

Degree Programme in Constructional Engineering and Economics
Högskoleingenjörsutbildning i byggteknik och ekonomi

180.0 credits

Valid for students admitted to the education from autumn 10 (HT - Autumn term; VT - Spring term).

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

Programme objectives

The interdisciplinary programme in Construction Engineering and Economics prepares the student for today and tomorrow’s ever more result-oriented businesses and organisation structures. The programme’s goal is to combine a Mechanical Engineer’s competencies with meaningful knowledge within business economy. The programme educates the student for work within the construction area as well as project management, production or administration. The programme will provide the student with base knowledge within the subject area and good orientation in the central elements, such as: project management, production and administration of buildings and construction. Furthermore, the programme aims to provide the student awareness about how construction affects society with regards to human needs and conditions, and if society’s goals regarding resource sustainability, economy and environment. In order to be able to follow the ever faster technical development and the changes it results in, the student must acquired the ability to delve into a new technical area and be given a good basis for continuous personal development and “life-long learning” both within the main area and new subject areas.

After the programme, the student should:

- have the ability to apply basic knowledge within natural science subject such as mathematics and mechanics
- be able to apply fundamental technical specialised knowledge within, for example, construction engineering, production, and computer-based engineering tools such as CAD.
- have the ability to understand connections between construction engineering and architecture (understanding for the builder and architect’s work)
- be able to independently solve minor technical problems within the construction engineering area
- have the skills to communicate orally and in writing, in English, and the ability to work effectively in projects
- have awareness about Swedish build and environment legislation such as plan and construction laws, building regulations and energy legislation.
- have knowledge about the players and work forms of the business
- have fundamental knowledge within industrial business
- have awareness about effects of work for humans and environments show the ability to work with current qualitative and quantitative economical estimation methods which are used in technology-oriented companies
- show knowledge about the technical and economical conditions which are put on industry businesses and their relation to their market participants
- Show the ability to judge capital need in short and long-term perspectives and collect foundations for decisions in order to finance development and expansion in smaller companies

Knowledge and understanding

Skills and abilities

Ability to make judgements and adopt a standpoint
**Extent and content of the programme**

The regular study time is 3 years, which comprises 180 higher education credits, and the courses are on the first level.

**Eligibility and selection**

For eligibility to the programme, basic eligibility and special eligibility are required in Mathematics course D, Physics course B, Chemistry course A. In each and every of these subjects, the lowest accepted grade is passed or 3. Selection based on grades is used in two-thirds of the places in the programme. The places are divided proportionally, based on the eligible applicants, into two groups. Selection based on the national university aptitude tests is used on one-third of the places in the programme.

**Implementation of the education**

**Structure of the education**

Most of the courses in the programme comprise 7.5 higher education credits, which are graded on a scale of A-E, F and Fx. The study year is normally divided into 4 study periods and, normally, two courses are taken in parallel every study period. The lectures, as well as the examination form vary from course to course. Normally, a portion of the course is constituted of lectures, which give first contact with concepts and theories. Exercises and labs strengthen the understanding of the theoretical connections. In accordance with the model from industry, project work plays an essential role in the education. Training is given to be able to, in a group, work with reality-related assignments in an engineering-related manner. In order strengthen the programme, collaboration between courses as well as between study years is stressed. The programme is concluded during the last term with a degree project which is often carried out outside of the school as an assignment from a company. The programme consists of obligatory courses during terms 1-5. Term 1 starts with three economy courses, then during terms 2-3 mainly courses within mathematics and fundamental construction engineering and mechanics are taken. In term 6, the student can choose an optional course within the programme. In construction engineering and economy, the economy courses are integrated, like most of the technical courses, often with help from authentic examples from different technology-oriented companies. Economy comprises five courses, totalling 37.5 higher education credits.

**Term 1**

The programme is started with a course in project work methodology which lays the foundation for the project work which is an essential portion of the entire programme and, at the same time, courses give the student the possibility to get to know each other. In addition, the other courses are three economy courses. Estimation and entrepreneurship, marketing, and external presentation are courses which cover the knowledge such as traditional economical studies give, but with the technical company as the central focus and knowledge in the interface between technology and economy.

**Terms 2-3**

The 4th economy course Financing and organisations theory is given in the beginning of term 2. During terms 2-3, two mathematics courses adapted to the application areas are taken. Courses within construction engineering, field measurements, construction physics, and construction materials and a project course within construction engineering with CAD is the core of the base courses within engineering which belong to the first year. During term 3, there is also the possibility to take an optional 3 higher education credits in design drawing with CAD as a specialisation in the project course within construction engineering. These elements give the student an introduction to and an understanding of the connection between architecture and construction engineering.

**Term 4-6**

During these terms, courses in Production engineering, electricity, social planning, geology and geo engineering are taken. In addition, the courses Environmental and work science and Competence and Development, which aim to prepare the student for the coming profession are included. The course Competence and development focuses on personal and professional development, and reflection on the coming professional role, and is therefore not subject-specific.
In the courses production engineering and environmental and work science, a common project which is carried out in groups at different construction sites is given.

The course construction engineering builds further on the courses in construction mechanics and the knowledge is applied in the most common construction materials in connection with Swedish norms and loads. In the course construction and design, the student attains deeper knowledge in construction design’s affect on character.

The 5th economics course, Applied industrial economy is given during this period. The course integrates technical knowledge with business economic model-thinking and methodology. The course gives the engineer further support to participate in society’s development. The students are strengthened in their professionalism in being able to apply business economy models in collaboration with their technical specialist knowledge. Technical process space is given a broader economic perspective.

When the students start their 6th and final term, they have 37.5 higher education credits in business economy and conclude their studies with an optional course within the specialisation and a degree project.

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
After 3 study terms, at least 60 higher education credits must be completed before the next term may be started. For students who do not fulfill this requirement, an individual study plan must be created in collaboration with the study guidance.

After 5 study terms, at least 105 higher education credits must be completed before the next term may be started. For student who do not fulfill this requirement, an individual study plan must be created in collaboration with the study guidance.

Recognition of previous academic studies
The student has the right to receive credit for education from another higher education institution/university within Sweden or abroad. The condition is that the course(s) are of such a nature and have such content that they correspond to the learning outcome goals which apply for the programme. Recognition of an entire course is approved by the GA. Elements of a course can be approved by the examiner.

Studies abroad
Students at the School of Technology and Health (STH) have the possibility to allocate one study year to studies abroad at a foreign institute with which KTH collaborates without having to pay the normal study fee which is possibly required by native students. Exchange studies can be done during the third study year. It is also possible to carry out the degree project abroad. Information about studies abroad is provided by supervisor for internationalisation who also informs about application deadlines. Application forms can be found at the study guidance office. Studies abroad can, after evaluation, be counted as a portion of the Bachelor of Science in Engineering programme. The student must, together with the school, build a so-called “Learning Agreement” which entails approval of the exchange studies in advance. The studies are normally instructed in the language which is spoken in the region or country. There are possibilities for one whom is accepted to the exchange programme in German, French, Spanish, and Italian speaking countries to take a prepared language course before the regular term starts.

Degree project
In the programme, a degree project comprising 15 higher education credits is included. This corresponds to about 10 weeks of full-time studies. See more, Guidelines for the degree project, The School for Technology and Health.
For the degree project, the following apply:

- It may be started at the earliest after 120 higher education credits are completed, and when all courses relevant to the degree project’s content are completed.
- It may be started after the assignment is approved by the examiner.
- It is based in the knowledge which has been acquired during the time of study and must normally be carried out during term 6.
- It must show proof of an independent work comprising theoretical and/or experimental work, and a relevant written report and oral presentation.
- The instructor is appointed by the specialisation leader or examiner.

Degree

In order to receive a Degree of Bachelor of Science in Engineering, degree programme in Construction Engineering and Economics, all courses in the study plan must be completed. The study plan consists of obligatory courses, optional courses and the degree project, and comprises at least 180 higher education credits.

Courses which, content-wise, overlap other courses in the programme may not be counted towards the 180 higher education credits which comprise the degree.

The student applies for the degree on a form and attaches receipts for the paid student union fees.

Appendix 1 - Course list
Appendix 2 - Programme syllabus descriptions
Appendix 1: Course list

Degree Programme in Constructional Engineering and Economics (TIBEA), Programme syllabus for studies starting in autumn 2010

General courses

Year 1

Mandatory courses (60.0 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF1710</td>
<td>Building Technology 1, Constructional Engineering and Design</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>AF1711</td>
<td>Building Technology 2, Building Physics and Materials</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>AF1713</td>
<td>Technical Work, Methods and Tools</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>HF1004</td>
<td>Mathematics and Statistics</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>HF1903</td>
<td>Mathematics 1</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>HS1003</td>
<td>Structural Mechanics 1</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>HS1004</td>
<td>Structural Mechanics 2</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>HS1005</td>
<td>Surveying and Mathematical Statistics</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

Year 2

Mandatory courses (60.0 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF1720</td>
<td>Environmental Science and Work Science</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>AF1730</td>
<td>Building Information Modeling</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>HS1006</td>
<td>The Building Process</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>HS1007</td>
<td>Fluid Mechanics</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>HS1008</td>
<td>Structural Design in Civil Engineering</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>HS1009</td>
<td>Urban Planning</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>HS1022</td>
<td>Economic and Technical Real Estate Management</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>HS1029</td>
<td>Geology and Soil Mechanics</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
</tbody>
</table>
Appendix 2: Specialisations

Degree Programme in Constructional Engineering and Economics (TIBEA), Programme syllabus for studies starting in autumn 2010

This programme has no specialisations.