



# Programme syllabus

## Degree Programme in Industrial Technology and Sustainability Civilingenjörsutbildning i industriell teknik och hållbarhet *300.0 credits*

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*Valid for students admitted to the education from autumn 18 (HT - Autumn term; VT - Spring term).*

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

### Programme objectives

In addition to the objectives specified in the Swedish Higher Education Ordinance, a graduate Master of Science in Engineering in Industrial Technology and Sustainability at KTH shall have the following knowledge, skills and judgement abilities:

#### Knowledge and understanding

- demonstrate broad knowledge within the chosen technical field, including knowledge in mathematics and natural science, and substantial specialised knowledge within certain parts of the field
- possess good knowledge and expertise in the issues and areas of sustainable development, gender equality, equal opportunities and diversity
- have a broad scientific foundation that enables them to work within a chosen technical field
- possess extensive technical and mathematical knowledge applied to engineering of production systems, logistics and maintenance
- have substantial applicable scientific knowledge about human factors and ergonomics relevant for work within production, logistics and maintenance
- demonstrate in-depth knowledge in production development for sustainable environment, work and business with a production system perspective

#### Skills and abilities

- demonstrate a good ability to, independently and in a group, apply knowledge and skills in practice while taking into account relevant scientific, professional/profession-related and societal assessments and standpoints
- demonstrate proficiency in being able to formulate, analyse, evaluate and manage technical problems and issues from a systems perspective, with a holistic view of their life cycle, from

concept/requirements to specification, development, operation and decommissioning, and an ability to set boundaries, minimise necessary resource consumption and manage processes for problem-solving/realisation

- show some ability to lead operations at different organisational levels, in different types of organisational life-cycle stages, within different types of logical frameworks
- possess the requisite personal and professional skills, such as in the area of language, leadership, project management, sustainable systems analysis, gender equality, equal opportunities and communication, to work as an engineer in a management position or as a leader within a technology-intensive company
- demonstrate proficiency in applying mathematically-based methods for analysing, modelling, optimising and evaluating industrial technology, processes and flows in the areas of production, logistics and maintenance with respect to sustainability
- demonstrate an ability to integrate technical and human aspects within socio-technical systems, for overall system performance and sustainability

### **Ability to make judgements and adopt a standpoint**

- have a particularly good understanding of the fact that engineering problems are often complex, can be incompletely defined and sometimes involve conflicting conditions
- adopt a reflective approach
- demonstrate accountability with regard to issues within technical, organisational, economic, ecological and societal systems

The KTH local Degree Ordinance can be found in the KTH regulatory framework [www.kth.se](http://www.kth.se)

## **Extent and content of the programme**

The Degree Programme in Industrial Technology and Sustainability comprises 300 higher education credits, which corresponds to 5 years of full-time studies at a normal study pace (10 semesters).

The programme's first three years (180 credits) are primarily first cycle.

During the two final years (120 credits), the student undertakes a Master's programme. Master's programme courses are conducted primarily in the second cycle.

### **The academic year 2019/2020 offers the following Master's programmes for a Degree Programme in Industrial Technology and Sustainability \***

- Sustainable production development
- Sustainable energy engineering
- Industrial management
- Production engineering and management
- Applied and computational mathematics
  - track Optimization and system theory (OPSA)

*\*The range of offered Master's programmes may be revised. An updated list of elective Master's programmes can be found on the KTH student web for each respective academic year.*

### **For students undertaking any of the following Master's programmes:**

Sustainable energy engineering, Industrial management, Applied and computational mathematics a complementary technical course profile is required to be examined in the programme Industrial technology and sustainability.

### **Language of instruction**

The language of instruction for the first three years of first cycle is mainly Swedish, but English literature is common. The courses in the final two years are mostly conducted in English

## **Eligibility and selection**

Admission to the Degree Programme in Engineering in Industrial Technology and Sustainability requires the general entry requirements for higher education, and also special admission requirements as follows:

*Upper-secondary education before 1 July 2011 and upper-secondary adult education before 1 July 2012*  
Field-specific entry requirement 9

### **Specific admission requirements corresponding to:**

Mathematics E, Physics B and Chemistry A.

In each of the subjects, a minimum grade of Pass or 3 is required.

*Upper-secondary education from 1 July 2011 and upper-secondary adult education from 1 July 2012 (Gy11/Vux12)*

Field-specific entry requirement A9

### **Specific admission requirements corresponding to:**

Mathematics 4, Physics 2 and Chemistry 1. A grade of E is required as a minimum in each of the subjects.

\* For more information on field-specific entry requirements, see [www.uhr.se](http://www.uhr.se)

For entry requirements and selection principles, see the KTH admission regulations - Admissionorder

## **Implementation of the education**

### **Structure of the education**

#### **Structure of the education**

#### **Academic year**

The academic year comprises 40 weeks and is divided into four periods. If necessary, instruction may be provided outside the parameters of the academic year.

The division of the academic year is presented on the KTH student web, <http://www.kth.se>

The graduate Master of Science in Engineering in Industrial Technology and Sustainability has KTH Södertälje as its main Campus. Some courses are given by other departments than Sustainable Production Development and are hence given at Campus Valhallavägen in Stockholm.

### ***Years 1-3, studies at first cycle***

The programme is organised around courses in applied subjects relating to mathematics, engineering science and technology. The teaching and use of professional skills and abilities of great importance to a certified engineer, for example, corporate and societal aspects, communication and sustainable development, are integrated into the courses.

To create a unified whole, the programme emphasises cooperation between different subjects, both within a specific year and between years. This is achieved through courses being coordinated on the schedule, via joint degree projects and written assignments.

The first 3 years conclude with a degree project for a Degree of Bachelor worth 15 credits within a chosen technical field. After successfully completing 180 credits, the student can apply for a technical Degree of Bachelor. If the qualification requirements are met, a Degree of Bachelor of Science is obtained.

### ***Mathematical natural science courses***

This block contains basic courses in mathematics and natural science and is mainly located in year 1 and year 2.

### ***Technology courses***

For the Master of Science in Engineering in Industrial Technology and Sustainability this is a block of core and basic technology courses for production, logistics, maintenance and ergonomics as well as systems engineering applied to production systems. These courses are given from year 1, through year 3.

### ***Years 4-5 Studies at second cycle***

Year 4 through year 5 in the Master of Science in Engineering in Industrial Technology and Sustainability is given as a masters programme and consists of specialised studies within a particular technology subject area at advanced level.

The education ends with a master thesis project work at advanced level for 30 ECTS, equivalent of 20 weeks of full time studies. There are certain requirements specified for when a master thesis project, at second cycle, may start. More information is found in the course plan for the thesis project course.

## **Courses**

The programme is course-based. Lists of courses are included in [appendix 1](#).

The programme consists of compulsory, conditionally elective, recommended and optional courses. The compulsory courses are defined for each year in course lists. The goals, entrance qualifications, content and course requirements for each course can be found in the official course syllabuses.

The forms of teaching and examination vary between courses. These are indicated in each official course syllabus.

The optional courses can be chosen from KTH's range of offered courses. Credits from courses at other universities/higher education institutions can also be transferred.

*The following limitations apply to optional courses:*

- Optional courses may not be taken in year 1.
- The number of credits that may be chosen per semester is limited to 35.
- An optional course may not correspond to a significant extent to an existing programme course or an already credited course.
- Higher education preparatory courses may not be counted as optional courses.
- Optional courses may be chosen but should be relevant to the professional role of engineer.

## **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.

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

Grades from international studies are not translated to KTH grading system in those instances when the grading system differ significantly from ours.

## **Conditions for participation in the programme**

Participation requires admission to courses within the programme and course registration. Course registration is done via the personal menu at [www.kth.se](http://www.kth.se)

For studies at a higher study year there are specific admission requirements for the courses. Admission requirements are specified in the course syllabus.

## **Application for courses on the programme**

Prior to each semester, the student must apply for all courses the student intends to take. Course applications are made via [www.antagning.se](http://www.antagning.se)

- 1 - 15 May for autumn semesters
- 1 - 15 November for spring semesters

If the student does not apply via [www.antagning.se](http://www.antagning.se), the application is only considered subject to availability.

The student can obtain information on how to apply from the school's office of student affairs.

## **Course registration**

Course registration requires that the student is admitted to the course. At course start, the student must register on the course to which they have been admitted. Course registration must be done individually, either via the student's personal login at [www.kth.se](http://www.kth.se) or according to instructions from the school offering the course.

A person who has registered on a course, but has subsequently decided not to proceed with the course, must inform the school offering the course as soon as possible or, within three weeks, remove the course registration via the personal login at [www.kth.se](http://www.kth.se)

## **Requirements for studies at second cycle, Master of Science in Engineering**

Prior to year 4/ Master's programme year 1, second cycle, the student chooses a Master's programme within the framework of their Degree Programme.

Choice of Master's programme is made during the period 1-15 May.

Choice of Master's programme is made by the students within the Degree Programme according to instructions from the KTH admissions office.

In order to be eligible for advanced level studies within the integrated Master of Science programmes at KTH, you are required to complete 150 credits from year one through three. Of these, 110 credits must be from the year 1 and 2 curriculum. In addition to these credits, the bachelor thesis needs to be completed before Master's level studies commence. In addition to the general requirements, special admission requirements apply to each master program

## **Recognition of previous academic studies**

Students have the opportunity to apply to be given credit for results from a course or courses at another higher education institution/university within or outside the country.

As the grading systems differ between countries and universities, grades are not translated to the KTH grading scale during credit transfer.

An application is made by submitting a form to the school's office of student affairs.

The entire KTH policy for credit transfer is included in the KTH regulatory framework.[www.kth.se](http://www.kth.se)

## **Studies abroad**

Students in the Program have the possibility to study abroad through the contracts KTH has with universities within EU and outside. Exchange studies can normally not be done in the first or second year. It is also possible to do the degree project work abroad.

The application deadline for studies abroad is around December 15th for the next coming academic year.

## **Degree project**

### **Degree Project, First Cycle**

The Degree Programme in Industrial Technology and Sustainability includes a degree project for a Degree of Bachelor of Science which comprises 15 credits.

The degree project is the final part of the education. The project work may begin when special admission requirements for the course are fulfilled.

In order to fulfill specific admission requirements for a Degree Project, first cycle, courses corresponding to at least 135 credits within the study programme, study year 1-3, first cycle, must be completed.

KTH's General Regulations for Degree Projects, first cycle, 15 credits for a Degree of Bachelor of Science 180 credits, are in KTH's regulations. [www.kth.se](http://www.kth.se)

### **Degree project, Second Cycle**

The Degree Programme in Industrial Technology and Sustainability includes a degree project for a Degree in Master of Science in Engineering, which comprises 30 credits.

The degree project is the final part of the education. The project work may begin when special admission requirements for the course are fulfilled.

In order to fulfill specific admission requirements for a Degree Project, second cycle, 30 credits, all courses in study year 1-3, first cycle, or courses required for the award of a Bachelors's degree, and courses corresponding to at least 60 credits, second cycle, must be completed. The courses at the second cycle, shall include courses in the programme relevant to the degree project, as well as courses in science theory and research methodology.

KTH's General Regulations for Degree Projects, second cycle, 30 credits for a Degree in Master of Science in Engineering 300 credits, are in KTH's regulations. [www.kth.se](http://www.kth.se)

### **Degree**

In order to complete a Degree in Master of Science in Engineering, Degree Program in Industrial Technology and Sustainability, requires an approved grade in all courses included in the students study plan based on the degree programme. The study plan shall comprise 300 credits, which includes a degree project, first cycle comprising 15 credits and a degree project, second cycle comprising 30 credits.

Optional introductory courses and preparatory courses cannot be included as part of the degree.

Courses whose content is similar to one or more other courses within the programme cannot be counted as part of the 300 credits that form the basis for the degree.

Optional courses will contribute to the degree programme Industrial Technology and Sustainability objectives of mechanical engineering and the professional role.

### **Application for a degree certificate**

The student must personally apply for a certificate. Applications are made via a personal login at [www.kth.se](http://www.kth.se).

The student has the possibility of applying for the following three degree:

- *Title of general qualification at first cycle*

Bachelor of Science (180 credits)

Teknologie kandidatexamen

- *Title of professional qualifications at second cycle*

Master of Science in Engineering

## Civiliingenjörsexamen

- *Title of general qualification at second cycle*

Master of Science (120 credits)

Teknologie masterexamen

Refer to the KTH guidelines (KTH regulatory framework), local directions for higher education qualifications at first and second cycle, the local Degree Ordinance <http://intra.kth.se/regelverk>

[Appendix 1 - Course list](#)

[Appendix 2 - Programme syllabus descriptions](#)





# Appendix 1: Course list

Degree Programme in Industrial Technology and Sustainability (CITEH), Programme syllabus for studies starting in autumn 2018

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## General courses

### Year 1

#### Mandatory courses (60.0 Credits)

Course code	Course name	Credits	Edu. level
<a href="#">ML1500</a>	<a href="#">Introduction to Industrial Technology</a>	7.5 hp	First cycle
<a href="#">ML1501</a>	<a href="#">Industrial Systems I</a>	7.5 hp	First cycle
<a href="#">ML1502</a>	<a href="#">Sustainability for Industry</a>	7.5 hp	First cycle
<a href="#">SF1624</a>	<a href="#">Algebra and Geometry</a>	7.5 hp	First cycle
<a href="#">SF1625</a>	<a href="#">Calculus in One Variable</a>	7.5 hp	First cycle
<a href="#">SF1626</a>	<a href="#">Calculus in Several Variable</a>	7.5 hp	First cycle
<a href="#">SG1117</a>	<a href="#">Engineering Mechanics</a>	7.5 hp	First cycle
<a href="#">SK1117</a>	<a href="#">Electromagnetism and Waves</a>	7.5 hp	First cycle

#### Supplementary information

Based upon the curriculum for academic year 2018/2019. Changes may occur.

### Year 2

#### Mandatory courses (60.0 Credits)

Course code	Course name	Credits	Edu. level
<a href="#">DD1310</a>	<a href="#">Programming Techniques</a>	6.0 hp	First cycle
<a href="#">ME1003</a>	<a href="#">Industrial Management, Basic Course</a>	6.0 hp	First cycle
<a href="#">MJ1112</a>	<a href="#">Applied Thermodynamics</a>	9.0 hp	First cycle
<a href="#">ML1018</a>	<a href="#">Fundamental Industrial Statistics</a>	6.0 hp	First cycle
<a href="#">ML1503</a>	<a href="#">Industrial Systems II</a>	6.0 hp	First cycle

<a href="#">ML1504</a>	<a href="#">Logistics in Production</a>	6.0 hp	First cycle
<a href="#">ML1505</a>	<a href="#">Industrial Systems III</a>	9.0 hp	First cycle
<a href="#">SF1546</a>	<a href="#">Numerical Methods, Basic Course</a>	6.0 hp	First cycle
<a href="#">SF1633</a>	<a href="#">Differential Equations I</a>	6.0 hp	First cycle

### Supplementary information

Based upon the curriculum for academic year 2019/2020. Changes may occur.

## Year 3

### Mandatory courses (36.0 Credits)

Course code	Course name	Credits	Edu. level
<a href="#">DD1320</a>	<a href="#">Applied Computer Science</a>	6.0 hp	First cycle
<a href="#">ML1507</a>	<a href="#">Communicating Engineer</a>	3.0 hp	First cycle
<a href="#">ML1508</a>	<a href="#">Dependability and Operational Maintenance</a>	6.0 hp	First cycle
<a href="#">ML150X</a>	<a href="#">Degree Project in Industrial Technology and Sustainability, First Cycle</a>	15.0 hp	First cycle
<a href="#">SF1811</a>	<a href="#">Optimization</a>	6.0 hp	First cycle

### Conditionally elective courses

Course code	Course name	Credits	Edu. level
<a href="#">ME2015</a>	<a href="#">Project Management: Leadership and Control</a>	6.0 hp	Second cycle
<a href="#">ME2063</a>	<a href="#">Team Leadership and Human Resource Management</a>	6.0 hp	Second cycle
<a href="#">MF1017</a>	<a href="#">Basic Electrical Engineering</a>	6.0 hp	First cycle
<a href="#">MG1002</a>	<a href="#">Automation Technology</a>	6.0 hp	First cycle
<a href="#">MG1016</a>	<a href="#">Manufacturing Technology</a>	6.0 hp	First cycle
<a href="#">MJ1401</a>	<a href="#">Heat Transfer</a>	6.0 hp	First cycle
<a href="#">SF1632</a>	<a href="#">Complementary Course in Differential Equations and Transforms</a>	3.0 hp	First cycle
<a href="#">SF1904</a>	<a href="#">Markov Processes, Basic Course</a>	3.0 hp	First cycle
<a href="#">SF1915</a>	<a href="#">Probability Theory and Statistics</a>	6.0 hp	First cycle
<a href="#">SG1220</a>	<a href="#">Fluid Mechanics for Engineers</a>	6.0 hp	First cycle

### Supplementary information

Based upon the curriculum for academic year 2019/2020. Changes may occur.



## Appendix 2: Specialisations

Degree Programme in Industrial Technology and Sustainability  
(CITEH), Programme syllabus for studies starting in autumn 2018

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This programme has no specialisations.