



# Programme syllabus

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

## Degree Programme in Vehicle Engineering 300 credits

Civilingenjörsutbildning i farkostteknik

*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

#### **The programme's aim**

Vehicle engineering concerns air and water vehicles, ground and rail automobiles and systems where these are components. The Master of Science in Engineering programme in Vehicle Engineering aims to provide the students with knowledge, abilities, and attitudes which are demanded in order to be able to participate in the development of vehicles and systems – from idea formulation, construction, and implementation (CDIO: conceive-design-implement-operate), to operation and maintenance. The programme also prepares the student for work within other parts of society where knowledge within applied mechanics or system technology is useful, as well as for research programmes.

The Vehicle Engineering programme's vision is to provide a Master of Science in Engineering program which emphasizes fundamental knowledge in the context of conceiving – Designing – Implementing – Operating complex technical systems and new products.

The Vehicle Engineering programme's fundamental idea is to provide an education which:

- integrates abilities in disciplinary mathematics, natural science, technical science and technology with general engineering abilities
- consists of a number of projects which include the elements of design, manufacturing and testing
- is supported by active and experience-based learning methods
- actively supports the teachers' development of their engineering experience
- takes place in common lecture halls, as well as, labs and workshops
- is developed through the constant improvement philosophy

### **The programme's objectives**

For a Degree of Master of Science in Engineering the student shall demonstrate the knowledge and skills required to work autonomously as a graduate engineer.

## Knowledge and understanding

**A student who has completed the programme should be able to:**

- demonstrate knowledge of the disciplinary foundation of and proven experience in his or her chosen field of technology as well as insight into current research and development work, and
- demonstrate both broad knowledge of his or her chosen field of technology, including knowledge of mathematics and the natural sciences, as well as a considerable degree of specialised knowledge in certain areas of the field.

## Skills and abilities

**A student who has completed the programme should be able to:**

- demonstrate the ability to identify, formulate and deal with complex issues autonomously and critically and with a holistic approach and also to participate in research and development work and so contribute to the formation of knowledge
- demonstrate the ability to create, analyse and critically evaluate various technological solutions
- demonstrate the ability to plan and use appropriate methods to undertake advanced tasks within predetermined parameters
- demonstrate the ability to integrate knowledge critically and systematically as well as the ability to model, simulate, predict and evaluate sequences of events even with limited information
- demonstrate the ability to develop and design 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
- demonstrate the capacity for teamwork and collaboration with various constellations, and

- demonstrate the ability to clearly present his or her conclusions and the knowledge and arguments on which they are based in speech and writing to different audiences in both national and international contexts.

## Ability to make judgements and adopt a standpoint

**A student who has completed the programme should be able to:**

- demonstrate the ability to make assessments informed by relevant disciplinary, social and ethical aspects as well as awareness of ethical aspects of research and development work
- 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 both social and economic aspects and also environmental and occupational health and safety considerations, and
- demonstrate the ability to identify the personal need for further knowledge and undertake ongoing development of his or her skills.

## Extent and content of the programme

The Master of Science in Engineering programme in Vehicle Engineering consists of 300 credits, which 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. The last two years are concluded in the second cycle.

The programme provides a stable technical foundation as well as knowledge and abilities to further the development of all possible vehicles. Years 4-5 focus on the specialisation areas. The programme gives students the ability to optimize the following factors: stability, solidity, security, environmentally friendly and comfort. This demands a combination of creative thinking and advanced calculation.

The first three years in the programme are mainly in Swedish; although, some English literature and occasional elements are used. The final two years of courses are mainly taught in English.

### **Master's programmes leading to a degree in Master of Science in engineering but with different application procedure**

The following programs leading to a degree in Master of Science in engineering but have different application procedure. The programs have limited places, different prerequisites and different application dates. More information on KTH's web

- Computer Simulation for Science and Engineering
- Maritime Engineering
- Energy Innovation: only track Nuclear Energy (NUEY)
- Dual Master in Aerospace Engineering (KTH/Bologna)
- Railway Engineering

# Eligibility and selection

## **General and specific entry requirements:**

For eligibility requirements and selection, see the KTH admission policy, [www.kth.se](http://www.kth.se)

## **Mathematics and Physics test**

Applicants to the civil engineering programme in Vehicle Engineering can take a mathematics and physics test.

This is a way, except for the grades and higher education test, to compete about the available places.

More information about the test:

<http://www.matematik-och-fysikprovet.se/ma-fyprovet-sv/>

## **Apply for later year of the program:**

To be able to apply for a later year of the program, the student must have fulfilled compulsory courses corresponding to 45 credits within the program at KTH. 35 credits shall belong to year 1 of the applied program.

# Implementation of the education

## Structure of the education

### **Structure of the education**

The study years for KTH's undergraduate programme is divided into four periods. For more information: <http://www.kth.se/student/schema/lasarsindelning-for-undervisning-och-examination-1.1007?programme=t>

The study programme is organized around courses in the mathematical, technical scientific and technical application subjects. The lectures in, and the use, of complementing personal and professional abilities meaningful for a Master of Science in Engineering, for example, communication, ethics, company and society aspects, are integrated into the courses.

To make the study programme complete, collaboration between different subjects within every study year as well as between the study years themselves, is emphasized. This means that the courses are being coordinated through common schedules, project work and hand-in assignments.

The study programme's plan consists partly of the compulsory courses in study (years 1-3) and partly of a specialisation from study (years 4-5) which ends with a degree project, second cycle, of 30 credits.

The lectures in study years 1-2, and portions of study year 3, are the same for everyone studying in the programme. Before the end of the bachelor studies, the student chooses a master's program

within the frame of the program.

The master's program which leads to a degree of Master of Science in Vehicle engineering are listed below

<https://www.kth.se/social/program/cfate/page/masterprogram/>

## Courses

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

In the study programme, there are compulsory, conditionally eligible and optional courses. The compulsory courses are defined in the teaching and time schedule for every study year and specialisation. The different courses' objectives, prerequisites, content and examination specifications are found in the respective course plans.

The space for optional courses within the Vehicle Engineering programme is first allocated in study year 3. Only with exception can optional courses be allowed before study year 3.

Optional courses can be chosen from KTHs course options for Master of Science in Engineering's programmes. Even courses from other universities can be approved.

For optional courses, the following restrictions apply:

- Optional courses can not be taken in study year 1
- Only with exception can optional courses be taken in study year 2
- The number of credits which can be chosen per semester can be limited.
- Optional courses cannot overlap study programme-specific courses to a meaningful extent.
- Higher education preparation courses may not be counted as optional courses
- Courses on lower levels within a subject than available study programme courses may not count as optional courses.

In year 4 and 5 differs the optional courses depending on the master's program requirements

## 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 are not translated from exchange studies abroad.

Degree project, first and second cycle, have grading scale pass (P) and fail (F).

# 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)

## Course Selection

Application to courses

The application of courses

- May 1-15 for the Autumn semester
- November 1- 15 for the Spring semester

at KTH's application for courses within study programme [kth.se-account](http://kth.se-account) by [www.antagning.se](http://www.antagning.se)

## Conditions for further studies

For students starting their education from the autumn semester 2018, previous promotion requirements have been replaced with special admission requirements to each course. Admission requirements are specified in the course syllabus.

### *For studies at advanced level, master level:*

- At least 165 credits from years 1-3 must be completed ( 60 credits from year 1 and 50 credits from year 2)
- The degree project, 15 must be completed
- In addition special requirements for different master's program

### *Applying to the advanced level within the Civilengineering programme:*

Application is done in the spring semester of study year 3, May 1 - 15. There is also a possibility to apply to a general master with an individual package of courses. Contact the student education office, the student counseling, for more information. <https://www.kth.se/social/program/cfate/page/masterprogram/>

## **Master's programmes leading to a degree in Master of Science in engineering but with different application procedure**

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- Maritime Engineering
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- Railway Engineering

## **Application for Individual Course Package**

Within the program in Civil Engineering there is a possibility to combine courses at advanced level to an individual course package. Please notice the different options within the different master's program.

Forms are available here:

[https://www.kth.se/social/files/5767b1bef276540f7635cef1/ans%C3%B6kan\\_generell\\_master%20131002.pdf](https://www.kth.se/social/files/5767b1bef276540f7635cef1/ans%C3%B6kan_generell_master%20131002.pdf)

In the application, the student must formulate the idea of the individual course package and define the courses to be included. For the degree project, a preliminary approval must be obtained from the examiner at the appropriate institution. At least 30 credits at advanced level must be within the same main field of study as the thesis.

The application will be submitted to the program office at the School of Engineering Sciences during the same period as the master's thesis will be made (1-15 May). Decisions of the application will be approved by the programme director

## **Recognition of previous academic studies**

The recognition of previous academic studies is an important element to facilitate the mobility within the country and between countries, for the higher education's internationalization work and for life-long learning.

KTH will have an open manner of recognition of previous academic studies. Recognition will, therefore, be a possibility if the exact programme does not exist at KTH, or the contents in, for example, course plans do not exactly correspond to KTH's. The requirements which KTH normally sets on the study programme's level and quality will be taken into consideration when recognizing previous academic studies.

A student at KTH studying at another university within an exchange agreement has the right to receive an advanced notification about recognition of previous studies. Such a notification can, for example, be given through a study plan which must be established and signed by the program director at KTH.

The student at KTH has the right to receive a trial recognition of previous academic studies. Even a student who is not a student at KTH, but has academic education and aims to complete it, must, submit the application and get a preliminary decision (advanced notification) about the recognition of previous academic studies.

Even degree project work can be exceptionally be recognized.

Decision about recognition of courses can be appealed through the Board of Appeals for higher education. The appeal must be submitted to KTH at the latest within three weeks from the day the applicant was notified of the decision.

In order to apply for recognition of previous academic studies, the applicant must normally be able to document that he/she has graduated in courses (corresponding) with at least passing results. The study performance is graded by the university where the exam was taken.

For more information visit [www.kth.se](http://www.kth.se)

## Studies abroad

Students in the Vehicle Engineering programme have the unique possibility to study as exchange students at first-class university all over the world. Exchange studies means that the student take courses at another university where KTH has an agreement.

Applying for exchange studies is done once a year. There is a possibility to choose to study one semester, one year, or two years (double degree) abroad.

For more information please contact the international coordinators for more information: [exchange-out@sci.kth.se](mailto:exchange-out@sci.kth.se).

More information about exchange studies could be found here:  
<http://www.kth.se/student/utlandsstudier>

## Degree project

### **Degree project, First cycle, 15 credits (bachelor)**

In the spring semester of year 3 the student must complete a first degree degree project in vehicle engineering amounting to 15 credits, corresponding to one semester of half-time studies. The project work may begin when special admission requirements for the course are fulfilled.

### **Degree project, Second cycle, 30 credits (master)**

A degree project work which corresponds to 30 credits corresponding to one semester full-time studies is also included in the study programme.

- The degree project work is normally carried out within a subject central to the programme's technical area.
- The degree project work may begin when the assignment is approved by the examiner of the chosen department and is submitted to the programme office
- The degree project work may begin when special admission requirements for the course are fulfilled.
- The examiner is responsible for the student to have sufficient prerequisites for the chosen assignment.
- The degree project work is based on the knowledge which is acquired during the entire study time and will normally be done during the tenth semester within the chosen specialisation. If the student desires to do degree project work within another specialization area, it must be approved by the programme director



- The degree project work should show that the student is capable to independently apply his/her acquired knowledge during the study time and therefore is done at the end of the programme; therefore, the start of the degree project is, at the earliest, during semester 9 within the chosen specialisation.
- The degree project work must provide proof of an independent, engineering-related work consisting of theoretical and/or experimental activity with a corresponding report.
- The degree project work can include other elements, for example, seminars, information searching, student teaching, opposition or other elements which the examiner or supervisor deems suitable.
- The degree project work is carried out individually or together with another student. In the later case, the examiner will ensure that every student's workload corresponds to the requirements for an individual degree project work.
- The supervisor for the degree project is appointed by the examiner

More information [www.kth.se](http://www.kth.se)

The application form for degree project <https://www.kth.se/social/files/5767b17df27654101d0b5982/examensarbetesansokan.pdf>

is submitted signed by the student, the school administration and the examiner. For degree project details and regulations are given from each department.

## Degree

The Master of Science in Engineering degree is received after the completion of the study programme. The student must fulfill the national and local degree requirements and has completed courses corresponding to 300 credits subject to the following.

- The mathematical-natural scientific subjects of at least 45 credits, and moreover, at least 180 credits (including 30 credits of degree project, second cycle, work) in the subject central to the technical area.
- At least 90 credits in the second cycle, where at least 60 credits (including 30 credits of degree project work) in the subjects central to the technical area.

The student must have complementing technical knowledge in accordance with the national degree ordinance and the study programme's local objectives.

The name of the degree is: "Degree of Master of Science in Engineering".

### Degree Application

The student has the possibility to apply for three different degrees, degree of Bachelor in Technology, Degree of Master of Science in Engineering, and Master's Degree in Engineering. The application for the degree is found at the personal menu at [www.kth.se](http://www.kth.se) – log in with the KTH-id.

KTH Regulations at the website: <https://www.kth.se/student/program/examen/examen-hur-och-var-ansoker-man-1.2234>

Appendix 1 - Course list  
Appendix 2 - Programme syllabus descriptions



# Appendix 1: Course list

## Degree Programme in Vehicle Engineering (CFATE)

### General courses

#### Year 1

#### Mandatory courses (60.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">SD1001</a>	Vehicle Engineering	9.0 hp	First cycle
<a href="#">SF1626</a>	Calculus in Several Variables	7.5 hp	First cycle
<a href="#">SF1668</a>	Mathematical and Numerical Analysis I	10.0 hp	First cycle
<a href="#">SF1675</a>	Applied Linear Algebra	13.5 hp	First cycle
<a href="#">SG1132</a>	Mechanics I Inclusive Project	11.0 hp	First cycle
<a href="#">SK1112</a>	Physics I	9.0 hp	First cycle

## Year 2

### Mandatory courses (61.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">MF1024</a>	Product Development	11.0 hp	First cycle
<a href="#">SD1120</a>	Noise and Vibration Control	9.0 hp	First cycle
<a href="#">SE1010</a>	Solid Mechanics, Basic Course with Project	12.0 hp	First cycle
<a href="#">SF1682</a>	Analytical and Numerical Methods for Differential Equations	11.0 hp	First cycle
<a href="#">SG1140</a>	Mechanics II	6.0 hp	First cycle
<a href="#">SG1216</a>	Thermodynamics	6.0 hp	First cycle
<a href="#">SG1217</a>	Fluid Mechanics, Basic Course	6.0 hp	First cycle

## Year 3

### Mandatory courses (36.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">EL1010</a>	Automatic Control, General Course	6.0 hp	First cycle
<a href="#">MF1017</a>	Basic Electrical Engineering	6.0 hp	First cycle
<a href="#">SD2125</a>	Signals and Mechanical Systems	6.0 hp	Second cycle
<a href="#">SE1025</a>	FEM for Engineering Applications	6.0 hp	First cycle
<a href="#">SF1861</a>	Optimization	6.0 hp	First cycle
<a href="#">SF1914</a>	Probability Theory and Statistics	6.0 hp	First cycle

## Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">EF112X</a>	Degree Project in Electrical Engineering, First Cycle	15.0 hp	First cycle
<a href="#">MF130X</a>	Degree Project in Machine Design, First Cycle	15.0 hp	First cycle
<a href="#">MF131X</a>	Degree Project in Integrated Product Development, First Cycle	15.0 hp	First cycle
<a href="#">MF133X</a>	Degree Project in Mechatronics, First Cycle	15.0 hp	First cycle
<a href="#">MJ146X</a>	Degree Project in Sustainable Energy Engineering, First Cycle	15.0 hp	First cycle
<a href="#">SA115X</a>	Degree Project in Vehicle Engineering, First Level	15.0 hp	First cycle

## Supplementary information

**Conditionally Elective Course:** Degree Project, First cycle, 15 university credits, Spring semester year 3.

**The last two years of the program are completed within the context of a master's program.**  
For information about curriculum in year 4-5 see masterprogrammes in - preliminar:

Aerospace Engineering, Vehicle Engineering, Sustainable Energy Engineering, Industrial Management, Engineering Design, Integrated Product Design - New Track Autumn 2016 - Track: Innovation Management and Product Development, Nuclear Energy Engineering, Naval Architecture, Engineering Mechanics, Applied and Computational Mathematics.

## Year 4

## Supplementary information

**The last two years of the program are completed within the context of a master's program.**

Courses taken within the fourth year will refer back to the first year's annual study plan in the master's program that you have chosen.

The selectable master's programs leading to a Master of Science in Vehicle Engineering are (preliminar):

- Aerospace Engineering
- Vehicle Engineering
- Sustainable Energy Engineering

- Industrial Management
- Engineering Design
- Integrated Product Design -New Track Autumn 2016 - Track: Innovation Management and Product Development,
- Nuclear Energy Engineering
- Naval Architecture
- Engineering Mechanics
- Applied and Computational Mathematics
- Systems, Control and Robotics

## Year 5

### Supplementary information

**The last two years of the program are completed within the context of a master's program.**

Courses taken within the fifth year will refer back to the second year's annual study plan in the master's program that you have chosen.

The selectable master's programs leading to a Master of Science in Vehicle Engineering are (preliminar):

- Aerospace Engineering
- Vehicle Engineering
- Sustainable Energy Engineering
- Industrial Management
- Engineering Design
- Integrated Product Design - New Track Autumn 2016 - Track: Innovation Management and Product Development,
- Nuclear Energy Engineering
- Naval Architecture
- Engineering Mechanics
- Applied and Computational Mathematics.
- Systems, Control and Robotics



# Appendix 2: Specialisations

## Degree Programme in Vehicle Engineering (CFATE)

This programme has no specialisations.