



Programme syllabus

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

Degree Programme in Computer Science and Engineering 300 credits

Civilingenjörsutbildning i datateknik

Valid for students admitted to the education from autumn 21 (HT - Autumn term; VT - Spring term).

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

Programme objectives

The Engineering programme in Computer Science at KTH aims to give students opportunities and ability to participate in and lead the work on valuation, development and introduction of new computer technology.

Knowledge and understanding

For the degree of Master of Science (in Engineering) from the programme Computer Science the student shall

- have fundamental knowledge within Computer Science and Engineering
- have profound knowledge in mathematics, i.e. have the ability to explain and carry out mathematical reasoning and define and analyse mathematical models
- have knowledge in human- and natural sciences, especially such knowledge which has consequences for design of computerized systems.

Skills and abilities

For the degree of Master of Science (in Engineering) from the programme Computer Science the student shall

- have prerequisites and abilities to participate in and develop the practices which are applied in industry, administration, and academic research
- have the ability to independently define and solve computer-related construction problems
- have the prerequisites for successful work in international and multidisciplinary project groups which consist engineers and non-engineers. This includes the ability to orally, and in writing, present as well as argue in Swedish and English.

Ability to make judgements and adopt a standpoint

For the degree of Master of Science (in Engineering) from the programme Computer Science the student shall

- independently analyse and adopt a standpoint on economical, societal, environment-related and ethical consequences of computer science applications, and to design systems concerning this
- through self-development, retain one's professional abilities during a professional career
- follow and promote the discussion concerning technology in society.

Extent and content of the programme

The Master of Computer Science and Engineering is composed of 300 ECTS credits, which corresponds to 5 years of full-time study (10 semesters). The first three years (180 ECTS credits) are on undergraduate level, and will be given in Swedish. The final two years (120 ECTS credits) will be given in English. Students in the Computer Science programme have a guaranteed place in the following master's programmes, but it can be changed. Note that there might be special course requirements for admission to some of the programmes.

- Computer Science (TCSCM)
- Interactive Media Technology (TIMTM)
- Software Engineering of Distributed Systems (TSEDM)
- ICT Innovation (TIVNM)

- Machine Learning (TMAIM)
- Information and Network Engineering (TINNM)
- Systems, Controls and Robotics (TSCRM)
- Communications Systems (TCOMM)
- Embedded Systems (TEBSM)
- Industrial Management (TINEM)
- Applied Computational Mathematics (TTMAM)
- Medical Engineering (TMLEM)

Eligibility and selection

General admission requirements and special admission requirements must be fulfilled in order to be admitted: Mathematics 4, Physics 2 and Chemistry 1, with the lowest grade E.

Selection is based on high school grades and results of the university examination, two thirds of the places are appointed on the basis of grades and one third on the basis of the university degree.

Implementation of the education

Structure of the education

Each academic year consists of two semesters which are 20 weeks each, and each semester is further divided into two study periods.

The syllabus for the Master of Computer Science and Engineering programme (300 ECTS) consists of:

- courses in study year 1–3 (180 ECTS), mostly mandatory courses. One of the courses are conditionally elective (6-7,5 ECTS). The elective courses will be between 13,5-15 ECTS. The academic year 3 concludes by a degree project at undergraduate level.
- courses in academic year 4-5 (120 ECTS), within the chosen master's programme, of which at least 60 credits must consist of courses in computer science at second cycle. Some of the masters programmes can have elective courses up to 30 ECTS, but some programmes have less than that or none at all. Academic year 5 is concluded by a degree project in second cycle.

Within the programme you can take courses to achieve one of two profiles:

- International profile within Japanese, Chinese, French, German and Spanish. The profile means that the student chooses one of the languages and from the spring term in year 2 reads language courses in preparation for exchange studies of 1-2 semesters at one of KTH's partner universities located in the profile's language area. Information about the application, any adjustments to the

educational plan and the requirements for achieving the international profile are given during the autumn term in year 2.

- Profile against language technology is offered in collaboration with the Department of Linguistics at Stockholm University. The first course in the profile is given in the autumn term in year 2. Information about the application, any adjustments to the educational plan and the requirements for achieving the language technology profile are given during the spring term in year 1.

Possibility to take a bachelor's degree

The MSc program in computer science is designed so that the student can apply for a technology bachelor's degree after three years. After that, the student can either continue on the civil engineering program or apply for other master's programs than those that are mapped, either in Sweden or abroad, or start working.

Courses

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

Courses at KTH can be either mandatory, conditionally elective or elective.

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.

The grading scale is found in the course syllabus.

Conditions for participation in the programme

Participation requires admission and course registration for courses given within the programme.

For further studies, special admission requirements for the course are to be fulfilled. Special admission requirements are listed in the respective course syllabus.

Conditions for further studies

The student must apply in year 3 for the master's programme study years 4–5. In order to be eligible for advanced level studies within the integrated Master of Science programmes at KTH, you are required to complete 165 credits from year 1-3. Of these, 110 credits must be from the year 1-2 curriculum. In addition to these credits, the bachelor thesis needs to be completed before Master's level studies commence. Additional specific eligibility requirements may apply to certain programmes and appear in the respective Education Plan.

Degree project

Within the programme there are requirements for two degree work courses, one in the first cycle in year 3 (15 credits) and one in year 5 within the second cycle (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.

Special conditions

For a student who does a degree project examined by any other school than EECS, the programme director for the Master of science of engineering programme in Computer Science and Engineering (CDATE) must approve the specification *before* the thesis can begin. The final report shall then also be reviewed by the programme director for CDATE to certify the relevance of the degree project in relation to the programme.

Degree

The degree is entitled “Civilingenjörsexamen” - Master of Science in Engineering. The text on the degree certificate states the educational programme, Computer Science and Engineering, completed by the student.

Appendix 1 - Course list

Appendix 2 - Programme syllabus descriptions



Appendix 1: Course list

Degree Programme in Computer Science and Engineering (CDATE)

General courses

Year 1

Mandatory courses (64.0 Credits)

| Code | Name | Credits | Edu. level |
|------------------------|---|---------|-------------|
| DA1600 | Writing in the Engineering Profession | 4.5 hp | First cycle |
| DD1337 | Programming | 7.0 hp | First cycle |
| DD1338 | Algorithms and Data Structures | 6.0 hp | First cycle |
| DD1349 | Project in Introduction to Computer Science | 3.0 hp | First cycle |
| DD1390 | Programme Integrating Course in Computer Science Engineering <i>Of which 2 credits belong to study year 1.</i> | 6.0 hp | First cycle |
| DD1396 | Parallel and Concurrent Programming in Introduction to Computer Science | 3.0 hp | First cycle |
| DH1620 | Human-Computer Interaction, Introductory Course | 6.0 hp | First cycle |
| SF1547 | Numerical Methods, Basic Course | 6.0 hp | First cycle |
| SF1624 | Algebra and Geometry | 7.5 hp | First cycle |
| SF1625 | Calculus in One Variable | 7.5 hp | First cycle |
| SF1671 | Mathematics, Basic course, with Discrete Mathematics | 7.5 hp | First cycle |

Year 2

Mandatory courses (57.0 Credits)

| Code | Name | Credits | Edu. level |
|------------------------|---|---------|-------------|
| DD1351 | Logic for Computer Scientists | 7.5 hp | First cycle |
| DD1362 | Programming Paradigms | 6.0 hp | First cycle |
| DD1368 | Database Technology | 6.0 hp | First cycle |
| DD1369 | Software Engineering in Project Form | 10.5 hp | First cycle |
| DD1390 | Programme Integrating Course in Computer Science Engineering <i>Of which 3 credits belong to study year 2.</i> | 6.0 hp | First cycle |
| IS1500 | Computer Organization and Components | 9.0 hp | First cycle |
| ME1010 | Organization and Knowledge-Intensive Work | 6.0 hp | First cycle |
| SF1924 | Probability Theory and Statistics | 6.0 hp | First cycle |

Conditionally elective courses

| Code | Name | Credits | Edu. level |
|------------------------|---|---------|-------------|
| DD1354 | Models and Simulation <i>At least one of DD1354 or SF1626 should be taken.</i> | 6.0 hp | First cycle |
| SF1626 | Calculus in Several Variables <i>At least one of DD1354 or SF1626 should be taken.</i> | 7.5 hp | First cycle |

Supplementary information

Information regarding conditionally elective courses

At least one of the two conditionally elective courses should be taken.

Year 3

Mandatory courses (50.0 Credits)

| Code | Name | Credits | Edu. level |
|--------|--|---------|--------------|
| AL1504 | Sustainable Development for Computer Science and Engineering | 7.5 hp | First cycle |
| DA150X | Degree Project in Computer Science and Engineering, First Cycle | 15.0 hp | First cycle |
| DD1390 | Programme Integrating Course in Computer Science Engineering <i>Of which 1 credit belong to study year 3.</i> | 6.0 hp | First cycle |
| DD2350 | Algorithms, Data Structures and Complexity | 9.5 hp | Second cycle |
| ID1200 | Operating Systems | 6.0 hp | First cycle |
| SF1688 | Discrete Mathematics | 6.0 hp | First cycle |

Supplementary information

Year 4

Supplementary information

During study years 4-5 the students follow a master programme of their choice. The listed master programmes below will give a Degree of Master of Science in Engineering in Computer Science (but it can be changed). For admission to some of the programmes it can be special eligibility requirements for admission, read more in the respective Education Plan.

- Computer Science (TCSCM)
- Interactive Media Technology (TIMTM)
- Software Engineering of Distributed Systems (TSEDM)
- ICT Innovation (TIVNM)
- Machine Learning (TMAIM)
- Information and Network Engineering (TINNM)
- Systems, Controls and Robotics (TSCRM)
- Communications Systems (TCOMM)
- Embedded Systems (TEBSM)
- Industrial Management (TINEM)

- Applied Computational Mathematics (TTMAM)
- Medical Engineering (TMLEM).

Year 5

Supplementary information

During study years 4-5 the students have to follow a master programme.



Appendix 2: Specialisations

Degree Programme in Computer Science and Engineering (CDATE)

This programme has no specialisations.