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 07 (HT - Autumn term; VT - Spring term).

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

Programme objectives

Computer Science and Engineering is the most influential factor on society and will remain so during the foreseeable future. An essential usage of Computer Science and Engineering is the efficiency of resource usage and communication in society for a sustainable development.

The Master of Science in Computer Science and Engineering programme at KTH aims to give the student the prerequisites and abilities to participate and lead work with appraisal, development and influence of new Computer Science and Engineering technologies.

Knowledge and understanding

The programme has the goal that a Master of Computer Science and Engineering should:

- show fundamental knowledge within Computer Science and Engineering.
- show fundamental knowledge in math. With this, the ability to explain and carry out mathematical reasoning and define and analyze mathematical models.
- show knowledge in human and natural sciences, especially such knowledge which has consequences for computerized systems' design.
- show knowledge about industrial entrepreneurship and relevant legislation.

Skills and abilities

The programme has the goal that a Master of Computer Science and Engineering should:

- 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 constructions problems.
- have the prerequisites for successful work in international and multidisciplinary project groups which consist of people from both technical and non-technical backgrounds. 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

The programme has the goal that a Master of Computer Science and Engineering should:

- Independently analyze 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 the discussion with technology in society and promote this.

A full description of degree requirements for the Master of Science in Engineering degree, Bachelor degree, and master's degrees can be found in KTHs local degree ordinance.

http://www.kth.se/info/kth-handboken/II/19/1x.html

Extent and content of the programme

The Master of Computer Science and Engineering is composed of 300 ECTS credits, which, at normal study rate, corresponds to 5 years of full-time study (10 semesters).

The first three years (180 ECTS credits) are on the first level and can, if the student applies for it, be finished with a Bachelor degree of computer Science and Engineering. The last two years are mainly in the second level (120 ECTS credits).

Programme Specialisations*
Autonomous Systems
Calculation Technology
Biomedical Technology
Computer Security
Computer Systems Technology
Distributed Systems
Industrial information and control systems
Informations Systems and Database Technology
Intelligent interactive systems
Internet Technology
Communications Systems
Human-Computer Interaction
Program Systems Technology
Language Technology
Theoretical Computer Science

* The list of specialisations is subject to change. Updated lists of all specialisations can be found in the study hand book for the respective study year.

Language of Instruction
The language of instruction, during the first three years of the programme is mostly Swedish; although English literature will be used. The concluding two years some courses are given in Swedish and some in English. For each course the language of instruction is found in the Course and program directory on the KTH student web site.

Eligibility and selection

In order to be accepted to the Master of Computer Science and Engineering programme the basic eligibility requirements as well as the following requirements must be met:
Mathematics D
Physics B
Chemistry A
All with at least a grade of G.

For eligibility requirements and selection guidelines, see KTH's admission policy
http://www.kth.se/info/kth-handboken/II/11/1.html

Implementation of the education

Structure of the education

The programme plan for the Master of Computer Science and Engineering partly consists of compulsory courses in study yearsa 1 and 2, and part of study year 3. In the spring of study year 3, the desired specialization is chosen. The entirety of study year 4 and half of study year 5 consist of courses in the second level from the specialization, corresponding to at least 37.5 ECTS credits. There is also room for elective courses in study years 4 and 5. The programme is concluded in the spring semester of study year 5 with a degree project worth 30 ECTS credits.

The specialisation in *Language Engineering* is special because it begins in the fall semester in study year 2 with the course Linguistics I which is taken at Stockholm university during the fall semester and replaces three compulsory courses and one conditionally elective course. (See appendix 2)

The programme is designed in such as manner that the student after three years of studies can obtain a bachelor's degree. The student can then continue his/her studies on the Computer science and engineering program, continue his/her studies in another program at KTH or another University in Sweden or abroad or start his/her work career.

Courses lists can be found in Appendix 1

Academic year

The KTH academic year is 40 weeks, divided into four periods. Each study period is followed by an examination period. There are also three re-examination periods.

For details about the structure of the academic year see http://www.kth.se/student/schema/1.1007?l=en_UK

Courses

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

The programme consists of compulsory, conditionally elective and elective courses. The compulsory courses are defined for every study year and specialization in the teaching and time schedule. The goals, prerequisites, contents and examination requirements for each course can be found in the Course and program directory on the KTH student web.

In study year three, there is allocated space for conditionally elective courses and elective courses within the Computer Science and Engineering programme. Only under certain circumstances can elective courses be taken earlier.

Elective courses can be chosen from KTH's course selection for Master of Science in Engineering programmes. Courses from other universities can be recognized for credit, if the degree requirements are fulfilled.

For elective courses, the following restrictions apply:

- Elective courses can not be taken in study year 1
- Only under certain circumstances can elective courses be taken in study year 2.
- The number of higher education credits which can be taken per semester can be limited.

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 enrollment

No later than November 15 and May 15 the student is required to make a study enrollment for the next semester at the CSC Program Office.

This study enrollment is required in order for the exam results to be registered.

Approved leave from studies

Approved leave from studies means that the student does not participate in the education during at least one study period. The student has the right to return to the education at a time agreed upon, and has the right to participate in the examination of non-finished courses.

Application for an approved leave is done on according to instructions from the CSC program office. When the student decides to return to the education, he/she is required to re-enroll to the studies.

Course Selection
Application to conditionally eligible and optional courses

From study year 3 and on the student is responsible for applying to all courses he/she wishes to take. This also applies to compulsory courses. The application for admission to a course is done according to instructions from the CSC school no later than

May 15th for the fall semester
November 15th for the spring semester

Applications made after this date are only granted if there are vacancies in the courses. Applications to language courses with prerequisites should be preceded by a qualification test.

In a few courses, the number of participants is limited. Selection is done by the school responsible for the course.

Admission to compulsory courses during study yerars 1–2 is, in most cases, automatic. Students wishing to study an individual specialization or choosing among alternative compulsory courses have to submit a special form.

Course registration

The student must register with the school responsible for the course at the start of each course, and also report to the school responsible for the course if the studies are discontinued.

Registration to a course requires formal acceptance to the course (by the school responsible for the course). Applications should be made according to instructions from the CSC school.

Conditions for being promoted to the next level

The following promotion requirements apply in order to participate in the next level of the education

Requirements for promotion from study year 1 to study year 2:
A total of at least 45 ECTS credits from study year 1 must be completed.

Requirements for promotion from study year 2 to study year 3:
A total of at least 90 ECTS credits from study years 1 and 2 must be completed.

Requirements for promotion from study year 3 to study year 4:
A total of at least 150 ECTS credits from study years 1-3 must be completed whereof 110 ECTS credits from study year 1-2, and the first level degree project.

Requirements for promotion from study year 4 to study year 5:

In addition to what applies for promotion to study 4, at least 45 higher education credits from study year 4 must be completed.

Individual study plan

Students who do not fulfill these requirements must – in cooperation with the CSC program office – make an individual study plan for continued studies.

Please see the KTH regulations: http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/1. 27217?l=en_UK

Specialisation Selection
The first opportunity for course selection occurs in the The first opportunity for course selection occurs in the spring semester in study year 3. At this time you choose those compulsory and conditionally elective courses that are in the specialisation you have chosen, as well as those elective courses you may wish to take the following semester.

For choice of specialization, you must turn in a form "preliminary specialisation choice" which can be found on the KTH student web.

In a few courses, the number of places is limited and selection is done based on merits such as grades and number of credits for the student who applied before the deadline. Selection is done by the school responsible for the course.

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 internationalization work of higher education and for life-long learning.

KTH will have an open attitude to recognition of previous academic studies. Recognition can, therefore, be made even if the 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.

Recognition of previous academic studies decided by another higher education institution in Sweden must normally be accepted by KTH.

A student at KTH who carries out studies at another university within the boundaries of an exchange agreement has the right to receive advanced notification about recognition of previous studies. Such a notification can, for example, be given through a Learning Agreement which must be established and signed by the coordinator at KTH, contact person at the university abroad and the student.

The student at KTH has the right to receive a trial recognition of previous academic studies. Even a person who is not a student at KTH, but has academic education and strives to complete it should – if possible – get a preliminary decision (advanced notification) about the recognition of previous academic studies.

Even degree project work can be recognized. KTH considers it, nevertheless, appropriate that the degree project work is performed at KTH (within a school or at a company with supervisor from KTH).

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 for a trial 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, not by the recognition of KTH.

http://www.kth.se/info/kth-handboken/II/13/3.html

Studies abroad

Students at the Master of Science in Engineering in Computer Science and Engineering programme have the opportunity to study one or two semesters abroad through agreements KTH has with universities within and outside the EU. Exchange studies are appropriate during the fourth or fifth study years. It is also possible to make the final degree project (second cycle) abroad.

It is also possible to take two degrees at certain European universities.

For more information contact the international coordinator at CSC.

Degree project

In the programme, a project work is done which corresponds to a course worth 30 ECTS credits, or about 5 months of full-time studies.

- The degree project is normally carried out within a subject central to the programme's technical area.

- The degree project may not be started before the topic is approved by the examiner at the chosen department and is submitted to the programme office on a special form.

- The main portion of the studies, at least 240 higher education credits must be completed. The student may not have more than two unfinished courses from the compulsory courses (in years 1-3).

- The examiner is responsible for the student having 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 the degree project within another specialisation area, it must be approved by the programme office.

- The degree project should show that the student is capable of independently applying his/her acquired knowledge during the study time and is therefore done at the end of the programme.

- The degree project must provide proof of an independent, scientific/engineering-related work, extensive theoretical, and/or experimental work with a corresponding report. The degree project can include other elements, for example, seminars, information searching, opposition, or other elements that the examiner or supervisor deems suitable.

- The degree project is carried out individually or together with another student. In the latter case, the examiner must ensure that the work of each student fulfills the requirements for an individual degree project.

- The supervisor is appointed by the examiner.

The application form for degree projects must be signed by the student and the examiner and submitted to the programme office.

More information, details and guidelines for degree projects can be found at the respective department.

The degree project can be carried our in the degree project subjects: Computer Science, Biomedical Engineering, Human-Computer Interaction, Media Technology, Numerical Analysis, Music Acoustics, Electro Acoustics, Speech Communication, Computer and Systems Sciences, Tele-informatics, and Industrial control systems.

Other subjects for the degree project may be considered upon application. For more information, contact the CSC program office.

http://www.kth.se/info/kth-handboken/II/15/1.html

Degree

Conditions for the 300 credit degree

The Master of Science in Engineering degree is received after completing the programme. The programme is designed so that the student fulfills the national degree requirements and has completed courses corresponding to 300 ECTS credits, including

- courses of at least 45 ECTS credits within mathematics-natural sciences, and, in addition, courses of at least 180 higher ECTS credits (including 30 ECTS credits from the degree project) in the subjects central to the technical area

- courses of at least 90 ECTS credits in the second cycle, whereof at least 60 ECTS credits (including 30 ECTS credits from degree project) in subjects central to the technical area

Degree name

Civilingenjörsexamen
Degree of Master of Science in Engineering, Degree Programme in Computer Science and Technology

Application for the Degree

The student applies for the Degree of Master of Science and Engineering: Computer Science and Engineering. The application for the degree is done on a special form and is submitted to the CSC program office.

KTHs local degree ordinance (KTH-Handbook)

http://www.kth.se/info/kth-handboken/II/19/1x.html

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 (60.0 Credits)

Code	Name	Credits	Edu. level
DD1340	Introduction to Computer Science	18.0 hp	First cycle
DH1600	Communication in Engineering Sciences	7.5 hp	First cycle
IE1204	Digital Design	7.5 hp	First cycle
SF1600	Calculus I, part 1	7.5 hp	First cycle
SF1604	Linear Algebra	7.5 hp	First cycle
SF1612	Mathematics, Basic Course	6.0 hp	First cycle
SF1642	Logic	6.0 hp	First cycle

Optional courses

Code	Name	Credits	Edu. level
EL1150	Introductory Matlab Course	1.5 hp	First cycle
SF1611	Introductory Course in Mathematics I	1.5 hp	First cycle

Year 2

Mandatory courses (64.5 Credits)

Code	Name	Credits	Edu. level
DD1352	Algorithms, Data Structures and Complexity	9.0 hp	First cycle
DD1361	Programming Paradigms	7.5 hp	First cycle
DN1241	Numerical Methods, Basic Course III	7.5 hp	First cycle
IS1200	Computer Hardware Engineering	7.5 hp	First cycle
ME1010	Organization and Knowledge-Intensive Work	6.0 hp	First cycle
SF1601	Calculus I, part 2	7.5 hp	First cycle
SF1631	Discrete Mathematics	12.0 hp	First cycle
SK1131	Physics: Waves and Particles	7.5 hp	First cycle

Year 3

Mandatory courses (37.5 Credits)

Code	Name	Credits	Edu. level
DD1364	Database Technology	7.5 hp	First cycle
DD1365	Software Engineering	6.0 hp	First cycle
DD143X	Degree Project in Computer Science, First Cycle	15.0 hp	First cycle
SF1906	Mathematical Statistics, Basic Course	9.0 hp	First cycle

Recommended courses

Code	Name	Credits	Edu. level
DH2620	Human-Computer Interaction, Introductory Course	6.0 hp	Second cycle
MJ2613	Sustainable Development	6.0 hp	Second cycle
SF1637	Differential Equations and Transforms III	6.0 hp	First cycle
SF1811	Optimization	6.0 hp	First cycle
SF1851	Optimization	6.0 hp	First cycle
SG1102	Mechanics, Smaller Course	6.0 hp	First cycle

Year 4

Supplementary information

During study years 4 and 5 the students follow a master program of their choice. For each year a list of master programs that may be chosen is established.

Batch 07 may choose one of the following programs:

- Computational and systems biology
- Computer science (in Swedish)
- Machine learning
- Human-computer interaction (in Swedish)
- Scientific computing
- Network services and systems
- Systems control and robotics
- Wireless systems
- Communication systems
- Software engineering of distributed systems
- System on chip design, track SoC platforms and architecture
- Engineering design, track mechatronics
- Industrial management
- Mathematics

The following two Erasmus Mundus programs may also be chosen, but a place is not guaranteed.

- Computer simulation for Science and Engineering
- Systems biology

Each master's program has eligibility requirements that must be fulfilled.

For some master's programs certain choices of elective courses may be required.

Industrial management

In order to get a degree of master of science in engineering in Computer science and engineering the student must have at least 90 credits at second level, of which at least 60 credits (including a 30-credit degree project) must be within the framework of the engineering area. Since the courses in industrial management are not within the framework you must choose 30 credits within the framework and also choose a task for the degree project that makes makes the degree project be within the framework.

Year 5

Supplementary information

During study year 5 the students continue their studies on the master's program they have chosen.

Master, Computational and Systems Biology (BSB)

Master, Communication Systems (COM)

Master, Computer Science (CSC)

Master, Computer Simulation for Science and Engineering (DTN)

Master, Human-Computer Interaction (HCI)

Master, Industrial Management (INE)

Master, Engineering Design (IPU2)

Master, Machine Learning (MAI2)

Master, Mathematics (MTH)

Master, Network Services and Systems (NSS)

Master, Scientific Computing (SCC)

Master, Systems, Control and Robotics (SCR)

Master, Software Engineering of Districuted Systems (SED)

Master, System-on-Chip Design (SKK)

Language Technology (STEK)

Year 2

Mandatory courses (60.0 Credits)

Code	Name	Credits	Edu. level
DD1352	Algorithms, Data Structures and Complexity	9.0 hp	First cycle
DH1701	Introduction to Linguistics	7.5 hp	First cycle
DH1702	General Linguistics	7.5 hp	First cycle
DH1703	Fonetics	7.5 hp	First cycle
DH1704	Linguistic Methods	7.5 hp	First cycle
SF1603	Calculus II, part 2	9.0 hp	First cycle
SF1631	Discrete Mathematics	12.0 hp	First cycle

Year 3

Mandatory courses (57.0 Credits)

Code	Name	Credits	Edu. level
DD1361	Programming Paradigms	7.5 hp	First cycle
DD1364	Database Technology	7.5 hp	First cycle
DD1365	Software Engineering	6.0 hp	First cycle
DD143X	Degree Project in Computer Science, First Cycle	15.0 hp	First cycle
DD2372	Automata and Languages	6.0 hp	Second cycle
ME1010	Organization and Knowledge-Intensive Work	6.0 hp	First cycle
SF1906	Mathematical Statistics, Basic Course	9.0 hp	First cycle

Year 4

Supplementary information

During study years 4 and 5 the students follow the master program Computer science, track language technology

Year 5

Supplementary information

During study years 4 and 5 the students follow the master program Computer science, track language technology

Master, Systems Biology (SYB)

Master, Wireless Systems (TLS)

Appendix 2: Specialisations

Degree Programme in Computer Science and Engineering (CDATE)

Master, Computational and Systems Biology (BSB)

Information about the study program is found at

http://www.kth.se/student/kurser/program/tbsbm/

Master, Communication Systems (COM)

The study program is found at

http://www.kth.se/student/kurser/program/tcomm/

Master, Computer Science (CSC)

The study program is found at

http://www.kth.se/student/kurser/program/tcscm/

Master, Computer Simulation for Science and Engineering (DTN)

The study program is found at

http://www.kth.se/student/kurser/program/tdtnm/

Seat is not guaranteed. Apply in the same way as all other students.

Master, Human-Computer Interaction (HCI)

The study program is found at

http://www.kth.se/student/kurser/program/thcim/

Master, Industrial Management (INE)

The study program is found at

http://www.kth.se/student/kurser/program/tinem/

Industrial management

In order to get a degree of master of science in engineering in Computer science and engineering the student must have at least 90 credits at second level, of which at least 60 credits (including a 30-credit degree project) must be within the framework of the engineering area. Since the courses in industrial management are not within the framework you must choose 30 credits within the framework and also choose a task for the degree project that makes makes the degree project be within the framework.

Master, Engineering Design (IPU2)

The study program is found at

http://www.kth.se/student/kurser/program/tipum/

Master, Machine Learning (MAI2)

The study program is found at

http://www.kth.se/student/kurser/program/tmaim/

Master, Mathematics (MTH)

The study program is found at

http://www.kth.se/student/kurser/program/tmthm/

Master, Network Services and Systems (NSS)

The study program is found at

http://www.kth.se/student/kurser/program/tnssm/

Master, Scientific Computing (SCC)

The stuyd program is found at

http://www.kth.se/student/kurser/program/tsccm/

Master, Systems, Control and Robotics (SCR)

The study program is found at

http://www.kth.se/student/kurser/program/tscrm/

Master, Software Engineering of Districuted Systems (SED)

The study program is found at

http://www.kth.se/student/kurser/program/tsedm/

Master, System-on-Chip Design (SKK)

The study program is found at

http://www.kth.se/student/kurser/program/tskkm/

Language Technology (STEK)

Language Engineering is a interdisciplinary area where language science and computer science meet. Language Engineering consists of all applications and usages of language knowledge during the development of programmes and systems which can recognize, interpret, and generate human language, both for spoken and written language.

The specialisation is special because it is started in the first term and contains: Linguistics I, 30 higher education credits, at SU during the fall term in study year 2. Other courses in the specialisation are given by KTH during the spring term in study year 3 and study year 4. Compared to the normal D-programme, four courses are missed for those taking the specialisation: Numerical methods, Computer Engineering, Physics and a conditionally optional course, in total 25 higher education credits.

Master, Systems Biology (SYB)

The study program is found at

http://www.kth.se/student/kurser/program/tsybm/

Seat is not guaranteed. Apply in the same way as all other students.

Master, Wireless Systems (TLS)

The study program is found at

http://www.kth.se/student/kurser/program/ttlsm/