



# Programme syllabus

Master's Programme, Computer Science, 120 credits

Masterprogram, datalogi

*120.0 credits*

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*Valid for students admitted to the education from autumn 11 (HT - Autumn term; VT - Spring term).*

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

## Programme objectives

The aim of the Master's programme is to provide a broad education in Computer Science with the possibility of deepening and specializing within the area of computer science, the method science for construction of computer programmes including theoretical foundations as well as the practical ability to develop products and systems which include computers and software.

The programme will provide the students with the requisites and abilities to participate and lead work within evaluation, development and implementation of new technology within the field of computer science.

## Knowledge and understanding

The objective of the program is to provide the student with:

- deepened knowledge within computer science and engineering,
- knowledge within at least one subject area complementary to technology.

The programme shall also provide the student with the opportunity to specialize with one of the following goals:

- provide a deepened knowledge within one or more of the areas: computer vision, robotics, artificial intelligence, and neuro-informatics,
- provide an orientation within computer security, foundations for technical computer security, and a deepened knowledge within one or more areas concerning technical aspects of computer security,
- provide a deepened knowledge within leadership and management of large IT projects and management of complex IT-environments. Also, an orientation within modeling and decision making in company-wide IT questions such as information security, modifiability, interoperability, etc.. is offered,

- provide deepened knowledge and understanding for methodology and scientific perspective within the internet technology area and provide the students with practical skills, above all, for initiation, configuration and maintenance of computer networks,
- provide deepened knowledge about software construction in a technical development context,
- provide deepened knowledge about solutions of resource-demanding computational problems and related combinatory/statistical analysis methods,
- provide an extended understanding for existent and non-existent efficient algorithms for different computational problems,
- implement and use language knowledge in the development of programmes and systems that can recognize, interpret and generate human language.

## **Skills and abilities**

The objective of the program is to provide the student with:

- a good analytical problem solving ability,
- the ability to independently define and solve construction problems within computer science,
- the requisites and abilities to participate in and develop practices implemented in industry, maintenance and academic research,
- the requisites for successful work in international and interdisciplinary project groups which include engineers and non-engineers. This goal includes abilities in oral and written presentation and argumentation in Swedish and English.

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

The objective of the program is that the student should:

- be able to evaluate the quality of scientific studies and show a reflective and critical approach to scientific and non-scientific texts,
- through self-development, retain his/her own professional ability during a professional career
- follow the discussion about technology in society and contribute to it.

Beyond this, there are similar goals for the Master of Science in Engineering programme which are defined by the higher education ordinance

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

The Computer Science programme comprises 120 ECTS credits, which, at normal study rate, corresponds to two years. The programme is in the second cycle and is given mainly in Swedish. Some courses can be given in English. Much of the course literature is in English.

The programme currently offers specializations within autonomous systems, computer security, industrial information and control systems, internet technology, programme system engineering, language technology and theoretical computer science.

## **Eligibility and selection**

## ***Students in the Master of Science in Engineering programme in Computer Science are entitled to the Master of Science in Engineering Degree***

Students in the Master of Science in Engineering programme at KTH where the Master's programme in Computer Science entitles the student to a Master of Science in Engineering degree at KTH can start the programme if, at the start of the semester, at least 150 ECTS credits from study years 1-3 including Bachelor Degree project and the courses listed below under specific admission requirements are fulfilled. They are guaranteed a place in the programme. The application must be done according to the instructions of the CSC school.

### ***Other Students***

*General Admission Requirements:* See KTHs admission requirements for Master's Programmes, link below.

*Special Admission Requirements:* Beyond the general admission requirements for the Master's programme, knowledge within mathematics, programming technology and computer science corresponding to the following courses is required.

- SF1600 Calculus I (one variable)
- SF1604 Linear algebra
- SF1631 Discreet mathematics
- DD1340 Introduction to computer science, or DD1320/DD1321 Applied computer science
- DD1352 Algorithms, data structures and complexity or DD2354 Algorithms and complexity
- DD1365/DD2385 Software engineering
- IS1200 Computer hardware engineering, or DD2377 Low level programming and computer architecture

Certain elective courses require further prerequisites.

*The Application* is done via [www.studera.nu](http://www.studera.nu) April 15th at the latest.

*Selection* is done based on university, grades and a total evaluation of completed courses within the main area of the program.

*KTH regulations:*

<http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/antagning/1.27191>

## **Implementation of the education**

### **Structure of the education**

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](http://www.kth.se/student/schema/1.1007?l=en_UK)

During the first semester five compulsory courses are taken, totaling 30 ECTS credits.

Beside the compulsory courses, 30 higher education credits are required in advanced courses within a specific area of computer science. These must either be part of a recommended specialisation or compiled by the student, but in the latter case, the course selection must be approved by the programme coordinator. Within each specialisation, courses can be freely chosen but considering prerequisites, or, in certain cases, places available.

At least one technology-complementary course must be included in the programme.

The programme is concluded by a degree project comprising 30 ECTS credits.

Other courses are elective.

## **Courses**

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

Courses are examined in many ways, for example by home assignments that are presented either using oral presentations or written reports, computer assignments, project work or traditional written exams.

After each course a student evaluation is performed and then analyzed by the course leader in the course analysis document, which is normally published on the web, see the KTH regulations of course analysis: <http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/kursanalys>

## **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.

Please see the KTH regulations:

[http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/registrering-uppflyttning/studieuppehall-1.27216?l=en\\_UK](http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/registrering-uppflyttning/studieuppehall-1.27216?l=en_UK)

*Selection of track* is done according to instructions from the CSC school.

### ***Selection of courses***

The student is required to apply for admission to all courses he/she wishes to take during the next semester. The student is responsible for having the recommended prerequisites. 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.

### ***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 according to instructions from the CSC school.

### ***Promotion to second year***

At least 45 ECTS credits have to be completed during the first academic year in order for the student to be promoted to the second year of the program.

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/registrering-uppflyttning/1.27217?l=en\\_UK](http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/registrering-uppflyttning/1.27217?l=en_UK)

## **Recognition of previous academic studies**

Credits for studies at another university can be received. An application form can be found on the KTH Student pages.

The application form is submitted to the CSC program office.

For in-depth information about the KTH policy for crediting previous studies, see [http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/prestationer/1.27200?l=en\\_UK](http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/prestationer/1.27200?l=en_UK)

## **Studies abroad**

Students of the program have the possibility to spend one or two semesters of study at a foreign university through agreements KTH has with universities within and outside the EU. It is also possible to make the final degree project abroad.

For more information contact the international coordinator at CSC.

More information can also be found at <http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/utbytesstudier>

## **Degree project**

An individual study in the form of a degree project corresponding to 30 ECTS credits is included in the program.

It is the responsibility of the student to find a suitable project task.

More information about the rules for degree projects at KTH can be found at [http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examensarbete/1.27212?l=en\\_UK](http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examensarbete/1.27212?l=en_UK)

## **Degree**

After completing the program, the student may apply for the Degree of Master of Science (Two Years), in Swedish: teknologie masterexamen.

Information on the application process can be found on the KTH Student pages.

### ***Requirements for the Degree of Master of Science (Two Years)***

The Degree of Master of Science (Two Years) is obtained after completion of the program. The program is designed so that students, when they graduate, have fulfilled the national requirements for a degree. This means that the students have completed courses comprising 120 ECTS credits, of which at least 90 ECTS credits are second cycle, and at least 60 ECTS credits (including a 30 ECTS credits degree project) constitute in-depth studies in the main field of study.

See also the KTH regulations [http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina/1.27227?l=en\\_UK](http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina/1.27227?l=en_UK)

[Appendix 1 - Course list](#)

[Appendix 2 - Programme syllabus descriptions](#)



# Appendix 1: Course list

Programme syllabus for studies starting in autumn 2011, Master's Programme, Computer Science, 120 credits (TCSCM)

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## General courses

### Year 1

#### Mandatory courses (30.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">DA2210</a>	<a href="#">Introduction to the Philosophy of Science and Research Methodology for Computer Scientists</a>	6.0 hp	Second cycle
<a href="#">DD2380</a>	<a href="#">Artificial Intelligence</a>	6.0 hp	Second cycle
<a href="#">DD2393</a>	<a href="#">Protocols and Principles of the Internet</a>	6.0 hp	Second cycle
<a href="#">DD2395</a>	<a href="#">Computer Security</a>	6.0 hp	Second cycle
<a href="#">DD2440</a>	<a href="#">Advanced Algorithms</a>	6.0 hp	Second cycle

#### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">AK2014</a>	<a href="#">Decision Theory</a>	7.5 hp	Second cycle
<a href="#">DD2372</a>	<a href="#">Automata and Languages</a>	6.0 hp	Second cycle
<a href="#">DD2387</a>	<a href="#">Program System Construction Using C++</a>	6.0 hp	Second cycle
<a href="#">DD2388</a>	<a href="#">Program System Construction using .NET Framework</a>	7.5 hp	Second cycle
<a href="#">DD2390</a>	<a href="#">Internet Programming</a>	6.0 hp	Second cycle
<a href="#">DD2423</a>	<a href="#">Image Analysis and Computer Vision</a>	7.5 hp	Second cycle
<a href="#">DD2425</a>	<a href="#">Robotics and Autonomous Systems</a>	9.0 hp	Second cycle
<a href="#">DD2427</a>	<a href="#">Image Based Recognition and Classification</a>	6.0 hp	Second cycle
<a href="#">DD2429</a>	<a href="#">Computational Photography</a>	6.0 hp	Second cycle
<a href="#">DD2431</a>	<a href="#">Machine Learning</a>	6.0 hp	Second cycle
<a href="#">DD2432</a>	<a href="#">Artificial Neural Networks and Other Learning Systems</a>	6.0 hp	Second cycle

<a href="#">DD2441</a>	<a href="#">Seminars on Theoretical Computer Science</a>	6.0 hp	Second cycle
<a href="#">DD2446</a>	<a href="#">Complexity Theory</a>	6.0 hp	Second cycle
<a href="#">DD2447</a>	<a href="#">Statistical Methods in Applied Computer Science</a>	6.0 hp	Second cycle
<a href="#">DD2448</a>	<a href="#">Foundations of Cryptography</a>	7.5 hp	Second cycle
<a href="#">DD2450</a>	<a href="#">Algorithmic Bioinformatics</a>	6.0 hp	Second cycle
<a href="#">DD2451</a>	<a href="#">Parallel and Distributed Computing</a>	6.0 hp	Second cycle
<a href="#">DD2456</a>	<a href="#">Advanced Object-oriented Systems</a>	7.5 hp	Second cycle
<a href="#">DD2457</a>	<a href="#">Program Semantics and Analysis</a>	6.0 hp	Second cycle
<a href="#">DD2458</a>	<a href="#">Problem Solving and Programming under Pressure</a>	9.0 hp	Second cycle
<a href="#">DD2459</a>	<a href="#">Software Reliability</a>	7.5 hp	Second cycle
<a href="#">DD2460</a>	<a href="#">Software Safety and Security</a>	7.5 hp	Second cycle
<a href="#">DD2471</a>	<a href="#">Modern Database Systems and Their Applications</a>	7.5 hp	Second cycle
<a href="#">DD2475</a>	<a href="#">Information Retrieval</a>	9.0 hp	Second cycle
<a href="#">DD2483</a>	<a href="#">Development of Web Applications with Enterprise Java</a>	6.0 hp	Second cycle
<a href="#">DD2488</a>	<a href="#">Compiler Construction</a>	9.0 hp	Second cycle
<a href="#">DD2491</a>	<a href="#">IP Routing in Internet and Other Complex Networks</a>	7.5 hp	Second cycle
<a href="#">DD2494</a>	<a href="#">Routing on the Internet and Other Packet Switched Networks</a>	9.0 hp	Second cycle
<a href="#">DD2495</a>	<a href="#">Network Security</a>	6.0 hp	Second cycle
<a href="#">DH2418</a>	<a href="#">Language Engineering</a>	6.0 hp	Second cycle
<a href="#">DH2620</a>	<a href="#">Human-Computer Interaction, Introductory Course</a>	6.0 hp	Second cycle
<a href="#">DN2221</a>	<a href="#">Applied Numerical Methods, part 1</a>	6.0 hp	Second cycle
<a href="#">DN2222</a>	<a href="#">Applied Numerical Methods, part 2</a>	3.0 hp	Second cycle
<a href="#">DT2112</a>	<a href="#">Speech Technology</a>	7.5 hp	Second cycle
<a href="#">DT2140</a>	<a href="#">Multimodal Interaction and Interfaces</a>	7.5 hp	Second cycle
<a href="#">EH2010</a>	<a href="#">Management of Technology</a>	7.5 hp	Second cycle
<a href="#">EH2020</a>	<a href="#">Industrial Control and Information Systems</a>	7.5 hp	Second cycle
<a href="#">EH2030</a>	<a href="#">Business Development and Quality Management</a>	7.5 hp	Second cycle
<a href="#">EH2040</a>	<a href="#">Industrial Information Systems, Systems Engineering</a>	7.5 hp	Second cycle
<a href="#">EH2050</a>	<a href="#">Industrial Information Systems, Case Studies</a>	7.5 hp	Second cycle
<a href="#">EH2730</a>	<a href="#">Requirements Engineering</a>	7.5 hp	Second cycle
<a href="#">EL1000</a>	<a href="#">Automatic Control, General Course</a>	6.0 hp	First cycle
<a href="#">EN2202</a>	<a href="#">Pattern Recognition</a>	7.5 hp	Second cycle
<a href="#">EP2200</a>	<a href="#">Queuing Theory and Teletraffic Systems</a>	7.5 hp	Second cycle
<a href="#">EP2210</a>	<a href="#">Performance Analysis of Communication Networks</a>	7.5 hp	Second cycle
<a href="#">EP2300</a>	<a href="#">Management of Networks and Networked Systems</a>	7.5 hp	Second cycle
<a href="#">EQ1220</a>	<a href="#">Signal Theory</a>	7.5 hp	First cycle
<a href="#">EQ1240</a>	<a href="#">Signal Processing</a>	7.5 hp	First cycle
<a href="#">FEL3320</a>	<a href="#">Applied Estimation</a>	7.5 hp	Third cycle
<a href="#">ID1217</a>	<a href="#">Concurrent Programming</a>	7.5 hp	First cycle
<a href="#">ID2002</a>	<a href="#">Value-Based Software Engineering</a>	7.5 hp	Second cycle
<a href="#">ID2003</a>	<a href="#">Software Testing and Metrics</a>	7.5 hp	Second cycle



<a href="#">ID2204</a>	<a href="#">Constraint Programming</a>	7.5 hp	Second cycle
<a href="#">ID2206</a>	<a href="#">Operating Systems</a>	7.5 hp	Second cycle
<a href="#">ID2209</a>	<a href="#">Distributed Artificial Intelligence and Intelligent Agents</a>	7.5 hp	Second cycle
<a href="#">ID2210</a>	<a href="#">Distributed Computing, Peer-to-Peer and GRIDS</a>	7.5 hp	Second cycle
<a href="#">ID2213</a>	<a href="#">Logic Programming</a>	7.5 hp	Second cycle
<a href="#">IK2213</a>	<a href="#">Network Services and Internet-based Applications</a>	7.5 hp	Second cycle
<a href="#">IK2554</a>	<a href="#">Practical Voice Over IP (VoIP)</a>	7.5 hp	Second cycle
<a href="#">IK2555</a>	<a href="#">Wireless and Mobile Network Architectures</a>	7.5 hp	Second cycle
<a href="#">IV2007</a>	<a href="#">Enterprise Computing and ERP Systems</a>	7.5 hp	Second cycle
<a href="#">IV2021</a>	<a href="#">Legal Aspects of Information Security</a>	7.5 hp	Second cycle
<a href="#">IV2031</a>	<a href="#">Strategic Management of IT</a>	7.5 hp	Second cycle
<a href="#">ME1003</a>	<a href="#">Industrial Management, Basic Course</a>	6.0 hp	First cycle
<a href="#">ME2042</a>	<a href="#">Business Negotiations</a>	6.0 hp	Second cycle
<a href="#">SF1841</a>	<a href="#">Optimization</a>	6.0 hp	First cycle
<a href="#">SF2708</a>	<a href="#">Combinatorics</a>	7.5 hp	Second cycle
<a href="#">SF2715</a>	<a href="#">Applied Combinatorics</a>	6.0 hp	Second cycle
<a href="#">SF2729</a>	<a href="#">Groups and Rings</a>	7.5 hp	Second cycle

### **Supplementary information**

The fall of study year 1 includes five compulsory courses, 30 credits.

For the spring semester the student chooses a track. During the spring semester of study year 1 and fall semester of study year 2 the student takes courses from the chosen track of at least 30 credits. The student must also take a non-technical course (TMS-course) The rest of the courses may be selected freely.

The tracks are presented on the KTH Education web site, <http://www.kth.se/utbildning/program/master-magisterutbildning/master-magisterprogram-svenska/svenska-master-magisterprogram/datalogi/kurser-1.51699>

#### ***Track courses***

Autonomous systems:

DD2387, DD2423, DD2425, DD2427, DD2429, DD2431, DD2432, DH2620, DN2221, DN2222, DT2112, EL1000, EL3320, EN2202, EQ1240, ID2204, ID2209, ID2213, SF1841

Computer security:

DD2387, DD2441, DD2448, DD2457, DD2458, DD2459, DD2460, DD2491, DD2494, DH2620, ID2002, ID2206, IV2021

Industrial information and control systems:

AK2014, DD2471, DH2620, EH2010, EH2020, EH2030, EH2040, EH2050, EH2730, ID2003, IV2007, IV2031, ME1003, ME2042

Internet technology:

DD2390, DD2491, DD2494, DD2495, EP2200, EP2210, EP2300, ID2206, ID2210, IK2213, IK2554, IK2555

Program system technology:

DD2372, DD2387, DD2388, DD2390, DD2431, DD2450, DD2451, DD2456, DD2457, DD2458, DD2460, DD2471, DD2475, DD2483, DD2488, DH2418, DH2620, ID1217, ID2206

Language technology:

DD2372, DD2387, DD2390, DD2431, DD2475, DH2418, DH2620, DT2112, DT2140

Theoretical computer science:

DD2372, DD2441, DD2446, DD2447, DD2448, DD2450, DD2451, DD2456, DD2457, DD2458, EQ1220, ID1217, SF1841, SF2708, SF2715, SF2729

The list below contains all courses that belong to a track.

## Year 2

### Mandatory courses (30.0 Credits)

Code	Name	Credits	Edu. level
<a href="#">DD221X</a>	<a href="#">Degree Project in Computer Science, Second Cycle</a>	30.0 hp	Second cycle

### Supplementary information

Courses to be taken during study year 2 will be decided in the fall of year 2011.

The degree project is performed in the spring semester of study year 2.

During the spring semester of study year 1 and fall semester of study year 2 the student takes courses from the chosen track of at least 30 credits. The course list for the first study year shows the courses for each track.

The student must also take a non-technical course (TMS-course). The rest of the courses may be selected freely.

## Track, Autonomous Systems (CSCA)

### Year 2

#### Conditionally elective courses

Code	Name	Credits	Edu. level
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<a href="#">DD2387</a>	<a href="#">Program System Construction Using C++</a>	6.0 hp	Second cycle
<a href="#">DD2423</a>	<a href="#">Image Analysis and Computer Vision</a>	7.5 hp	Second cycle
<a href="#">DD2425</a>	<a href="#">Robotics and Autonomous Systems</a>	9.0 hp	Second cycle
<a href="#">DD2429</a>	<a href="#">Computational Photography</a>	6.0 hp	Second cycle
<a href="#">DD2431</a>	<a href="#">Machine Learning</a>	6.0 hp	Second cycle
<a href="#">DH2620</a>	<a href="#">Human-Computer Interaction, Introductory Course</a>	6.0 hp	Second cycle
<a href="#">DN2221</a>	<a href="#">Applied Numerical Methods, part 1</a>	6.0 hp	Second cycle
<a href="#">DN2222</a>	<a href="#">Applied Numerical Methods, part 2</a>	3.0 hp	Second cycle
<a href="#">EL1000</a>	<a href="#">Automatic Control, General Course</a>	6.0 hp	First cycle
<a href="#">EN2202</a>	<a href="#">Pattern Recognition</a>	7.5 hp	Second cycle
<a href="#">FEL3320</a>	<a href="#">Applied Estimation</a>	7.5 hp	Third cycle
<a href="#">ID2209</a>	<a href="#">Distributed Artificial Intelligence and Intelligent Agents</a>	7.5 hp	Second cycle
<a href="#">ID2213</a>	<a href="#">Logic Programming</a>	7.5 hp	Second cycle

## Track, Computer Security (CSCB)

### Year 2

#### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">DD2387</a>	<a href="#">Program System Construction Using C++</a>	6.0 hp	Second cycle
<a href="#">DD2441</a>	<a href="#">Seminars on Theoretical Computer Science</a>	6.0 hp	Second cycle
<a href="#">DD2451</a>	<a href="#">Parallel and Distributed Computing</a>	6.0 hp	Second cycle
<a href="#">DD2457</a>	<a href="#">Program Semantics and Analysis</a>	6.0 hp	Second cycle
<a href="#">DD2458</a>	<a href="#">Problem Solving and Programming under Pressure</a>	9.0 hp	Second cycle
<a href="#">DH2620</a>	<a href="#">Human-Computer Interaction, Introductory Course</a>	6.0 hp	Second cycle
<a href="#">EP2510</a>	<a href="#">Advanced Networked Systems Security</a>	7.5 hp	Second cycle
<a href="#">EP2520</a>	<a href="#">Building Networked Systems Security</a>	7.5 hp	Second cycle
<a href="#">IV2021</a>	<a href="#">Legal Aspects of Information Security</a>	7.5 hp	Second cycle

## Track, IT-Management with Enterprise Architecture (CSCC)

### Year 2

#### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">AK2014</a>	<a href="#">Decision Theory</a>	7.5 hp	Second cycle
<a href="#">DH2620</a>	<a href="#">Human-Computer Interaction, Introductory Course</a>	6.0 hp	Second cycle
<a href="#">EH2010</a>	<a href="#">Management of Technology</a>	7.5 hp	Second cycle
<a href="#">EH2030</a>	<a href="#">Business Development and Quality Management</a>	7.5 hp	Second cycle

<a href="#">EH2730 Requirements Engineering</a>	7.5 hp	Second cycle
<a href="#">EH2780 IT Management with Enterprise Architecture II, Case Studies</a>	12.0 hp	Second cycle
<a href="#">IV2029 Global IT-management</a>	7.5 hp	Second cycle
<a href="#">ME2042 Business Negotiations</a>	6.0 hp	Second cycle

## Track, Program System Technology (CSCD)

### Year 2

#### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">DD2418</a>	<a href="#">Language Engineering</a>	6.0 hp	Second cycle
<a href="#">DD2431</a>	<a href="#">Machine Learning</a>	6.0 hp	Second cycle
<a href="#">DD2451</a>	<a href="#">Parallel and Distributed Computing</a>	6.0 hp	Second cycle
<a href="#">DD2458</a>	<a href="#">Problem Solving and Programming under Pressure</a>	9.0 hp	Second cycle
<a href="#">DH2620</a>	<a href="#">Human-Computer Interaction, Introductory Course</a>	6.0 hp	Second cycle

## Track, Language Technology (CSCE)

### Year 2

#### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">DD2387</a>	<a href="#">Program System Construction Using C++</a>	6.0 hp	Second cycle
<a href="#">DD2418</a>	<a href="#">Language Engineering</a>	6.0 hp	Second cycle
<a href="#">DD2431</a>	<a href="#">Machine Learning</a>	6.0 hp	Second cycle
<a href="#">DH2620</a>	<a href="#">Human-Computer Interaction, Introductory Course</a>	6.0 hp	Second cycle
<a href="#">DT2140</a>	<a href="#">Multimodal Interaction and Interfaces</a>	7.5 hp	Second cycle

## Track, Theoretical Computer Science (CSCF)

### Year 2

#### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">DD2441</a>	<a href="#">Seminars on Theoretical Computer Science</a>	6.0 hp	Second cycle
<a href="#">DD2447</a>	<a href="#">Statistical Methods in Applied Computer Science</a>	6.0 hp	Second cycle
<a href="#">DD2451</a>	<a href="#">Parallel and Distributed Computing</a>	6.0 hp	Second cycle
<a href="#">DD2458</a>	<a href="#">Problem Solving and Programming under Pressure</a>	9.0 hp	Second cycle
<a href="#">EQ1220</a>	<a href="#">Signal Theory</a>	7.5 hp	First cycle

# Track, Computational Biology (CSCG)

## Year 2

### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">BB2250</a>	<a href="#">Applied Gene Technology</a>	6.0 hp	Second cycle
<a href="#">BB2440</a>	<a href="#">Bioinformatics and Biostatistics</a>	7.0 hp	Second cycle
<a href="#">BB2470</a>	<a href="#">Genetics and Genomics</a>	10.0 hp	Second cycle
<a href="#">BB2510</a>	<a href="#">Proteomics</a>	6.0 hp	Second cycle
<a href="#">DD2397</a>	<a href="#">Applied Bioinformatics</a>	7.5 hp	Second cycle
<a href="#">DD2431</a>	<a href="#">Machine Learning</a>	6.0 hp	Second cycle
<a href="#">DD2435</a>	<a href="#">Mathematical Modelling of Biological Systems</a>	9.0 hp	Second cycle
<a href="#">DD2447</a>	<a href="#">Statistical Methods in Applied Computer Science</a>	6.0 hp	Second cycle
<a href="#">EL1820</a>	<a href="#">Modelling of Dynamical Systems</a>	6.0 hp	First cycle
<a href="#">EL2620</a>	<a href="#">Nonlinear Control</a>	7.5 hp	Second cycle
<a href="#">EN2202</a>	<a href="#">Pattern Recognition</a>	7.5 hp	Second cycle
<a href="#">SF2940</a>	<a href="#">Probability Theory</a>	7.5 hp	Second cycle
<a href="#">SK2520</a>	<a href="#">Experimental Methods in Molecular Biophysics</a>	8.0 hp	Second cycle
<a href="#">SK2530</a>	<a href="#">Introduction to Biomedicine</a>	6.0 hp	Second cycle

# Track, Computer Systems Engineering (CSCH)

## Year 2

### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">ID2202</a>	<a href="#">Compilers and Execution Environments</a> <i>Either DD2488 or ID2202 can be taken</i>	7.5 hp	Second cycle
<a href="#">IS2200</a>	<a href="#">Parallel Computer Systems</a>	7.5 hp	Second cycle

# Track, Sound and Music Computing (CSCI)

## Year 2

### Conditionally elective courses

Code	Name	Credits	Edu. level
<a href="#">DT1130</a>	<a href="#">Spectral Transforms</a>	7.5 hp	First cycle
<a href="#">DT2140</a>	<a href="#">Multimodal Interaction and Interfaces</a>	7.5 hp	Second cycle

<a href="#">DT2300 Sound in Interaction</a>	7.5 hp	Second cycle
<a href="#">DT2410 Audio Technology</a>	7.5 hp	Second cycle
<a href="#">EN2100 Sound Perception</a>	7.5 hp	Second cycle
<a href="#">EN2202 Pattern Recognition</a>	7.5 hp	Second cycle



## Appendix 2: Specialisations

Programme syllabus for studies starting in autumn 2011, Master's Programme, Computer Science, 120 credits (TCSCM)

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### **Track, Autonomous Systems (CSCA)**

No information entered.

### **Track, Computer Security (CSCB)**

No information entered.

### **Track, IT-Management with Enterprise Architecture (CSCC)**

No information entered.

### **Track, Program System Technology (CSCD)**

No information entered.

### **Track, Language Technology (CSCE)**

No information entered.

### **Track, Theoretical Computer Science (CSCF)**

No information entered.

### **Track, Computational Biology (CSCG)**

No information entered.

### **Track, Computer Systems Engineering (CSCH)**

No information entered.

### **Track, Sound and Music Computing (CSCI)**

No information entered.