Programme syllabus

Master's Programme, Computer Science, 120 credits
Masterprogram, datalogi
120.0 credits

Valid for students admitted to the education from autumn 14 (HT - Autumn term; VT - Spring term).

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

Programme objectives

This program syllabus, decided by the CSC dean 2013-09-27 is valid for students starting the program during the study year 2014/2015. Which courses that belong a study year is decided in the fall the year before. Please see ”Study year 1” etc. or the appendices. Changes may occur in the contents of the program and in the KTH regulations, please see www.kth.se/en/student.

The aim of the Master’s programme is to provide a broad education in Computer Science with the possiblity 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.

Besides the goals stated in the Swedish Higher Education Ordinance the following goals apply. Link to goals stated in the Swedish Higher Education Ordinance: http://www.csc.kth.se/utbildning/dokument/HSVmal/hsvmastereng.pdf

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 programme is in the second cycle and comprises 120 ECTS credits, which, at normal study rate, corresponds to two years. The programme is given in English, but some elective courses are given in Swedish.

The programme currently offers specializations within autonomous systems, computational biology, computer security, computer system technology, IT-Management with Enterprise architecture, sound and music computing, programme system engineering, language technology and theoretical computer science.

The students also have the possibility to define an individual track which must be approved by the programme director.

Eligibility and selection

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

Special Admission Requirements:

The minimum criterias are that the following must be in the bachelor degree

- Mathematics: three different subjects of a total of 22,5 credits. Among those subject there must be one course in one-variabel calculus and one course in Linear Algebra or Discrete Mathematics.

- Computer Science/Information technology: three different subjects of a total of 22.5 credits. Among those subjects there must be one course in Object oriented programming and one course in Algorithms and Data structures.

Please note that additional knowledge might be required to be able to follow certain track in the master programme.

The special admission requirement may not be assessed as not fullfilled if;

- the average grade is in the lower third on the grading scale used

- the degree does not qualify for admission to equivalent Master level in the country where the degree is awarded.

Selection process:

If the number of applicants exceeds the number of places avilable a programme comittee will make a selection from the following criterias:

1. evaluation of university

2. grades from previous study

3. motivation to study

4. merit rating

5. references

6. proficiency in English

KTH regulations: http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/1.276218

Implementation of the education

Structure of the education

Structure of the education

This program syllabus, decided by the CSC dean 2013-09-27 is valid for students starting the program during the study year 2014/2015. Which courses that belong a study year is decided in the fall the year before. Please see ”Study year 1” etc. or the appendices. Changes may occur in the contents of the program and in the KTH regulations, please see www.kth.se/en/student.

The KTH academic year is 40 weeks, divided into four periods.

For details about the structure of the academic year see http://www.kth.se/en/student/schema/

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

Beside the compulsory courses, 30 ECTS 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.

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.

The course goals, prerequisites, contents and examination requirements are found in the course syllabus in the Course and program directory on the KTH student web. For each study year there is a course list.

For elective courses, the following restrictions apply:

- The number of credits that can be chosen per semester can be limited.
- Elective courses may not overlap a course already taken to a considerable extent.
- Courses on lower levels within a subject than the programme courses may not count as elective courses.

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.

Since the grading systems differ very much between different countries, the grades are not translated from exchange studies abroad.

Conditions for participation in the programme

Semester enrollment

At the start of each semester the student is required to make a study enrollment for the next semester at My pages.

The study enrollment is required for taking new courses and for study 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.

Approved leave from studies is not granted during study year 1. Exceptions may be made if there are extraordinary reasons.

http://intra.kth.se/en/regelverk/utbildning-forskning/grundutbildning/registrering-uppflyttning/studieuppehall/1.27216

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 responsibe 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.

A student may only take courses that are included in the study plan.

Course registration

The student must, at course start, register for each course. Course registration for compulsory as well as elective courses must be done individually. If the student registers for a course and then decides to not continue, the student must report this as soon as possible.

Registration to a course requires formal acceptance to the course (by the school responsible for the course). Applications should be done 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/en/regelverk/utbildning-forskning/grundutbildning/1.27217

Recognition of previous academic studies

Credits for studies at another university can be transferred. 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 credit transfer, see http://intra.kth.se/en/regelverk/utbildning-forskning/grundutbildning/prestationer/1.27200

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 be found on the KTH student web and 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/en/regelverk/utbildning-forskning/grundutbildning/examensarbete/1.27212

For students on a Master of science of engineering program not only the requirements set by the selected Master program to begin the degree project apply but also the requirements from the Master of science of engineering program.

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 indepth studies in the main field of study.

See also the KTH regulations http://intra.kth.se/en/regelverk/utbildning-forskning/grundutbildning/examina/1.27227

Appendix 1 - Course list
Appendix 2 - Programme syllabus descriptions

Appendix 1: Course list

Master's Programme, Computer Science, 120 credits (TCSCM), Programme syllabus for studies starting in autumn 2014

General courses

Year 1

Mandatory courses (62.0 Credits)

Course code	Course name	Credits	Edu. level
DA2210	Introduction to the Philosophy of Science and Research Methodology for Computer Scientists	6.0 hp	Second cycle
DD2300	Program Integrating Course in Computer Science	2.0 hp	Second cycle
DD2352	Algorithms and Complexity Compulsory for those who have not taken this course or DD1352	7.5 hp	Second cycle
DD2380	Artificial Intelligence	6.0 hp	Second cycle
DD2395	Computer Security Included in course pool and one of them is compulsory.	6.0 hp	Second cycle
DD2440	Advanced Algorithms Follow the course in year 2 instead, if reading DD2352 in year 1.	6.0 hp	Second cycle
ID2200	Operating Systems Included in course pool 1. One of them is compulsory.	6.0 hp	Second cycle
IK2218	Protocols and Principles of the Internet	6.0 hp	Second cycle
SF1630	Discrete Mathematics External students (not CDATE students) shall read SF1630 (Swe) or SF2736 (Eng).	9.0 hp	First cycle
SF2736	Discrete Mathematics External students (not CDATE students) shall read SF1630 (Swe) or SF2736 (Eng).	7.5 hp	Second cycle

Supplementary information

The fall of study year 1 includes four compulsory courses, 24 credits.

For the spring semester is one compulsory course taken. The student chooses a track and 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.

Courses from the course pool **must** be included in the study plan.

Year 2

Mandatory courses (62.0 Credits)

Course code	Course name	Credits	Edu. level
DA224X	Degree Project in Computer Science and Communication, Second Cycle External admitted master student at CSC.	30.0 hp	Second cycle
DA225X	Degree Project in Computer Science and Communication, Second Cycle For engineering students at CSC.	30.0 hp	Second cycle
DD2300	Program Integrating Course in Computer Science	2.0 hp	Second cycle

Supplementary information

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 rest of the courses may be selected freely.

Track, Autonomous Systems (CSCA)

Year 1

Conditionally elective courses

Course code	Course name	Credits	Edu. level
DD2423	Image Analysis and Computer Vision	7.5 hp	Second cycle
DD2427	Image Based Recognition and Classification	6.0 hp	Second cycle
DD2431	Machine Learning	6.0 hp	Second cycle
DD2432	Artificial Neural Networks and Other Learning Systems	6.0 hp	Second cycle
DD2438	Artificial Intelligence and Multi Agent Systems	15.0 hp	Second cycle
DD2476	Search Engines and Information Retrieval Systems	9.0 hp	Second cycle
DT2112	Speech Technology	7.5 hp	Second cycle
EN2202	Pattern Recognition	7.5 hp	Second cycle
EQ1240	Signal Processing	7.5 hp	First cycle
FEL3320	Applied Estimation	7.5 hp	Third cycle
ID2209	Distributed Artificial Intelligence and Intelligent Agents	7.5 hp	Second cycle

ID2213	Logic Programming	7.5 hp	Second cycle
SF1811	Optimization	6.0 hp	First cycle

Year 2

Conditionally elective courses

Course code	Course name	Credits	Edu. level
DD2423	Image Analysis and Computer Vision	7.5 hp	Second cycle
DD2425	Robotics and Autonomous Systems Limited number of participants	9.0 hp	Second cycle
DD2431	Machine Learning	6.0 hp	Second cycle
EN2202	Pattern Recognition	7.5 hp	Second cycle
ID2209	Distributed Artificial Intelligence and Intelligent Agents	7.5 hp	Second cycle

Track, Computer Security (CSCB)

Year 1

Conditionally elective courses

Course code	Course name	Credits	Edu. level
DD2387	Program System Construction Using C++	6.0 hp	Second cycle
DD2448	Foundations of Cryptography	7.5 hp	Second cycle
DD2458	Problem Solving and Programming under Pressure	9.0 hp	Second cycle
DD2459	Software Reliability	7.5 hp	Second cycle
DH2620	Human-Computer Interaction, Introductory Course	6.0 hp	Second cycle
EP2500	Networked Systems Security The course EP2500 has to be read, after that can EP2520 and EP2510 be selected.	7.5 hp	Second cycle
EP2510	Advanced Networked Systems Security The course EP2500 has to be read, after that can EP2520 and EP2510 be selected.	7.5 hp	Second cycle
EP2520	Building Networked Systems Security The course EP2500 has to be read, after that can EP2520 and EP2510 be selected.	7.5 hp	Second cycle

Year 2

Conditionally elective courses

Course

code	Course name	Credits	Edu. level
DD2387	Program System Construction Using C++	6.0 hp	Second cycle
DD2443	Parallel and Distributed Computing	7.5 hp	Second cycle
DD2458	Problem Solving and Programming under Pressure Limited number of participants!	9.0 hp	Second cycle
EP2500	Networked Systems Security	7.5 hp	Second cycle
EP2510	Advanced Networked Systems Security EP2500 recommended to be taken first.	7.5 hp	Second cycle

Track, IT-Management with Enterprise Architecture (CSCC)

Year 1

Conditionally elective courses

Course code	Course name	Credits	Edu. level
AK2014	Decision Theory	7.5 hp	Second cycle
DD2459	Software Reliability	7.5 hp	Second cycle
DD2471	Modern Database Systems and Their Applications	7.5 hp	Second cycle
DH2620	Human-Computer Interaction, Introductory Course Only for them who has not been reading DH1620.	6.0 hp	Second cycle
EH2010	Management of Technology	7.5 hp	Second cycle
EH2030	Business Development and Quality Management	7.5 hp	Second cycle
EH2770	IT Management with Enterprise Architecture I	7.5 hp	Second cycle
EH2781	IT Management with Enterprise Architecture II, Case Studies	15.0 hp	Second cycle
EP2520	Building Networked Systems Security	7.5 hp	Second cycle
ME1003	Industrial Management, Basic Course	6.0 hp	First cycle
ME2042	Business Negotiations Can be followed period 1+2 or 3+4	6.0 hp	Second cycle

Year 2

Conditionally elective courses

Course code	Course name	Credits	Edu. level
EH2030	Business Development and Quality Management	7.5 hp	Second cycle
EH2720	Management of Projects	7.5 hp	Second cycle
EH2781	IT Management with Enterprise Architecture II, Case Studies	15.0 hp	Second cycle

Track, Program System Technology (CSCD)

Year 1

Conditionally elective courses

Course code	Course name	Credits	Edu. level
DD2386	Patterns for Large-scale Development	7.5 hp	Second cycle
DD2387	Program System Construction Using C++	6.0 hp	Second cycle
DD2388	Program System Construction using .NET Framework	7.5 hp	Second cycle
DD2390	Internet Programming	6.0 hp	Second cycle
DD2418	Language Engineering	6.0 hp	Second cycle
DD2431	Machine Learning	6.0 hp	Second cycle
DD2457	Program Semantics and Analysis	6.0 hp	Second cycle
DD2458	Problem Solving and Programming under Pressure	9.0 hp	Second cycle
DD2471	Modern Database Systems and Their Applications	7.5 hp	Second cycle
DD2476	Search Engines and Information Retrieval Systems	9.0 hp	Second cycle
DD2488	Compiler Construction	9.0 hp	Second cycle
DH2620	Human-Computer Interaction, Introductory Course Only for them who has not been reading DH1620.	6.0 hp	Second cycle
ID1217	Concurrent Programming	7.5 hp	First cycle

Year 2

Conditionally elective courses

Course code	Course name	Credits	Edu. level
DD2386	Patterns for Large-scale Development	7.5 hp	Second cycle
DD2387	Program System Construction Using C++	6.0 hp	Second cycle
DD2418	Language Engineering	6.0 hp	Second cycle
DD2431	Machine Learning	6.0 hp	Second cycle
DD2443	Parallel and Distributed Computing	7.5 hp	Second cycle
DD2458	Problem Solving and Programming under Pressure Limited number of participants!	9.0 hp	Second cycle

Track, Language Technology (CSCE)

Year 1

Conditionally elective courses

Course code	Course name	Credits	Edu. level

DD2387	Program System Construction Using C++	6.0 hp	Second cycle
DD2390	Internet Programming	6.0 hp	Second cycle
DD2418	Language Engineering	6.0 hp	Second cycle
DD2431	Machine Learning	6.0 hp	Second cycle
DD2457	Program Semantics and Analysis	6.0 hp	Second cycle
DD2476	Search Engines and Information Retrieval Systems	9.0 hp	Second cycle
DH2620	Human-Computer Interaction, Introductory Course	6.0 hp	Second cycle
DT2112	Speech Technology	7.5 hp	Second cycle
DT2140	Multimodal Interaction and Interfaces	7.5 hp	Second cycle
SF1904	Markov Processes, Basic Course	3.0 hp	First cycle

Year 2

Conditionally elective courses

Course code	Course name	Credits	Edu. level
DD2387	Program System Construction Using C++	6.0 hp	Second cycle
DD2418	Language Engineering	6.0 hp	Second cycle
DD2431	Machine Learning	6.0 hp	Second cycle
DT2140	Multimodal Interaction and Interfaces	7.5 hp	Second cycle

Track, Theoretical Computer Science (CSCF)

Year 1

Conditionally elective courses

Course code	Course name	Credits	Edu. level
DD2441	Seminars on Theoretical Computer Science	6.0 hp	Second cycle
DD2447	Statistical Methods in Applied Computer Science	6.0 hp	Second cycle
DD2448	Foundations of Cryptography	7.5 hp	Second cycle
DD2457	Program Semantics and Analysis	6.0 hp	Second cycle
DD2458	Problem Solving and Programming under Pressure	9.0 hp	Second cycle
EQ1220	Signal Theory	7.5 hp	First cycle
ID1217	Concurrent Programming	7.5 hp	First cycle
SF1811	Optimization	6.0 hp	First cycle
SF2729	Groups and Rings	7.5 hp	Second cycle

Year 2

Conditionally elective courses

Course code	Course name	Credits	Edu. level
DD2443	Parallel and Distributed Computing	7.5 hp	Second cycle
DD2445	Complexity Theory	7.5 hp	Second cycle
DD2458	Problem Solving and Programming under Pressure Limited number of participants!	9.0 hp	Second cycle

Supplementary information

The course DD2445 will be given this academic year (and will be alternated with DD2442 Seminars on Theoretical Computer Science, 7,5 credits next academic year).

Track, Computational Biology (CSCG)

Year 1

Conditionally elective courses

Course code	Course name	Credits	Edu. level
BB2250	Applied Gene Technology	6.0 hp	Second cycle
BB2440	Bioinformatics and Biostatistics	7.0 hp	Second cycle
BB2470	Genetics and Genomics	10.0 hp	Second cycle
BB2510	Proteomics	6.0 hp	Second cycle
DD2257	Visualization	7.5 hp	Second cycle
DD2390	Internet Programming	6.0 hp	Second cycle
DD2398	Quantitative Systems Biology	7.5 hp	Second cycle
DD2399	Omic Data and Systems Biology	7.5 hp	Second cycle
DD2400	Cellular and Molecular Biology	15.0 hp	Second cycle
DD2401	Neuroscience	7.5 hp	Second cycle
DD2402	Advanced Individual Course in Computational Biology	6.0 hp	Second cycle
DD2404	Applied Bioinformatics	7.5 hp	Second cycle
DD2431	Machine Learning	6.0 hp	Second cycle
DD2432	Artificial Neural Networks and Other Learning Systems	6.0 hp	Second cycle
DD2435	Mathematical Modelling of Biological Systems	9.0 hp	Second cycle
DD2447	Statistical Methods in Applied Computer Science	6.0 hp	Second cycle
DD2476	Search Engines and Information Retrieval Systems	9.0 hp	Second cycle
EL1820	Modelling of Dynamical Systems	6.0 hp	First cycle
EL2620	Nonlinear Control	7.5 hp	Second cycle
EN2202	Pattern Recognition	7.5 hp	Second cycle
EN2500	Information Theory and Source Coding	7.5 hp	Second cycle

SF1811	Optimization	6.0 hp	First cycle
SF2940	Probability Theory	7.5 hp	Second cycle
SF2943	Time Series Analysis	7.5 hp	Second cycle
SF2950	Applied Mathematical Statistics	7.5 hp	Second cycle
SK2520	Experimental Methods in Molecular Biophysics	8.0 hp	Second cycle
SK2530	Introduction to Biomedicine	6.0 hp	Second cycle

Year 2

Conditionally elective courses

Course code	Course name	Credits	Edu. level
BB2440	Bioinformatics and Biostatistics	7.0 hp	Second cycle
BB2510	Proteomics	6.0 hp	Second cycle
DD2404	Applied Bioinformatics	7.5 hp	Second cycle
DD2431	Machine Learning	6.0 hp	Second cycle
DD2435	Mathematical Modelling of Biological Systems	9.0 hp	Second cycle
DD2447	Statistical Methods in Applied Computer Science	6.0 hp	Second cycle
EN2202	Pattern Recognition	7.5 hp	Second cycle

Track, Computer Systems Engineering (CSCH)

Year 1

Conditionally elective courses

Course code	Course name	Credits	Edu. level
DD2488	Compiler Construction Either DD2488 or ID2202 can be taken	9.0 hp	Second cycle
ID1217	Concurrent Programming	7.5 hp	First cycle
ID2202	Compilers and Execution Environments Either DD2488 or ID2202 can be taken	7.5 hp	Second cycle
IL2206	Embedded Systems	7.5 hp	Second cycle
IL2212	Embedded Software	7.5 hp	Second cycle
IL2217	Digital Design with HDL	7.5 hp	Second cycle
IS2200	Parallel Computer Systems	7.5 hp	Second cycle
IS2205	Individual Studies in Computer Systems	7.5 hp	Second cycle

Year 2

Conditionally elective courses

Course code	Course name	Credits	Edu. level
ID2202	Compilers and Execution Environments	7.5 hp	Second cycle
IL2206	Embedded Systems	7.5 hp	Second cycle
IL2217	Digital Design with HDL	7.5 hp	Second cycle
IS2200	Parallel Computer Systems	7.5 hp	Second cycle

Track, Sound and Music Computing (CSCI)

Year 1

Conditionally elective courses

Course code	Course name	Credits	Edu. level
DT1130	Spectral Transforms	7.5 hp	First cycle
DT2112	Speech Technology	7.5 hp	Second cycle
DT2118	Speech and Speaker Recognition	7.5 hp	Second cycle
DT2140	Multimodal Interaction and Interfaces	7.5 hp	Second cycle
DT2212	Music Acoustics	7.5 hp	Second cycle
DT2213	Musical Communication and Music Technology	7.5 hp	Second cycle
DT2215	Advanced Individual Course in Music Communication	6.0 hp	Second cycle
DT2300	Sound in Interaction	7.5 hp	Second cycle
DT2350	Human Perception for Information Technology	6.0 hp	Second cycle
DT2410	Audio Technology	7.5 hp	Second cycle
EN2202	Pattern Recognition	7.5 hp	Second cycle

Year 2

Conditionally elective courses

Course code	Course name	Credits	Edu. level
DT1130	Spectral Transforms	7.5 hp	First cycle
DT2140	Multimodal Interaction and Interfaces	7.5 hp	Second cycle
DT2300	Sound in Interaction	7.5 hp	Second cycle
DT2350	Human Perception for Information Technology	6.0 hp	Second cycle
DT2410	Audio Technology	7.5 hp	Second cycle
EN2202	Pattern Recognition	7.5 hp	Second cycle

Appendix 2: Specialisations

Master's Programme, Computer Science, 120 credits (TCSCM), Programme syllabus for studies starting in autumn 2014

Track, Autonomous Systems (CSCA)

Track, Computer Security (CSCB)

Track, IT-Management with Enterprise Architecture (CSCC)

Track, Program System Technology (CSCD)

Track, Language Technology (CSCE)

Track, Theoretical Computer Science (CSCF)

Track, Computational Biology (CSCG)

Track, Computer Systems Engineering (CSCH)

Track, Sound and Music Computing (CSCI)