Programme syllabus

Degree Programme in Information and Communication Technology
Civilingenjörsutbildning i informationsteknik
300.0 credits

Valid for students admitted to the education from autumn 16 (HT - Autumn term; VT - Spring term).

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

Programme objectives

Thematically, the students should obtain basic disciplinary knowledge, skills and competencies during the first three years of the education in the core areas of information and communication technology: mathematics, electronics, computer, communication and software engineering. Under the final two years of the education, knowledge and skills are deepened within some subarea coinciding with a master's education at KTH or an Erasmus Mundus Master's programme where KTH participates.

In addition to the requirements of the Higher Education Ordinance the following apply:

Knowledge and understanding

To be awarded an engineering degree in informatics, the student should:

- be able to apply mathematics and basic natural sciences within information - and communication technology
- be able to analyze technical problems from a systems perspective with an overall view on technical systems and their life cycle from conception, design, implementation, possibly production, operation, maintenance and phasing-out.
- be able to follow and utilize the knowledge development within the field of technology.

For students that choose to read language courses the goal should be that student should be able to:

- follow and utilize the knowledge development within the field of technology on respective language (European languages: Spanish, German, French and Brasilian Portugese).
- follow and utilize the knowledge development within the field of technology on respective language at a general level (Chinese and Japanese).

Skills and abilities

To be awarded an engineering degree in informatics, the student should:

- within the area of information and communication technology be able to apply creative and critical working methods to formulate and explore problems with modern methods and tools
- be able to analyze technical problems from a systems perspective with an overall view on technical systems and their life cycle from conception, design, implementation, possibly production, operation, maintenance and phasing-out.
- be able to work with problem-solving that takes its starting point in the product or the need and functionality considering the individual's using the product and the technology interplay in the society.
- have skills of efficient oral and in written communication, in Swedish and English, with different target groups. Corresponding to what is required for an international career.
For students that choose to read language courses the goal should be that student should be able to:

- communicate efficient with colleagues on the language in question (European languages: Spanish, German, French and Brazilian Portuguese)
- be able to work as an engineer in countries where the language is native (all languages)

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

For an engineering degree in informatics, the student should:

- appreciate that engineering problems are complex, often can be not well defined, and sometimes contain conflicting conditions
- by exercise and reflection have developed an ability to work efficient in groups of different compositions, nationalities and abilities.

Reference to KTH's local Degree Ordinance http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning

**Extent and content of the programme**

The education comprises five years and 300 credits.

The three first years are for first-cycle studies and the final two for second-cycle studies. The final two years the student takes a specialization that coincides with a Master's programme.

The selection of elective Master's programmes can be changed, as the KTH programmes offered on master's level may change. Easmus Mundus programmes where KTH participates can, after approval from the programme co-ordinator, also constitute a specialization. For Erasmus Mundus programmes there are no reserved/guaranteed seats. These programmes must be applied to in competition with other applicants. Currently, the following Master's programmes constitute possible specializations:

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

Students can be qualified to follow other Master's programme within KTH. If a student wants to follow another Master's programme than those listed as possible specialisations, consultation should take place with the programme co-ordinator for the IT-programme.

Students following the master programme in Industrial Management should take at least 30 HE Credits of technology courses from the mandatory courses in one of the following master programmes:

- Software engineering of distributed systems (TSEDM)
- Communication systems (TCOMM)
- Embedded systems (TEBSM)

KTH's policy is that first-cycle courses are taught in Swedish and that second-cycle studies are conducted in English. The majority of courses for second-cycle studies are consequently in English. Some courses for first-cycle studies can be in English dependent on the teachers.
Eligibility and selection

See eligibility for KTH's programmes:

https://www.kth.se/utbildning/anmalan-antagning-behorighet/behorighet/behorighet-till-kth-s-utbildningar-pa-grundniva-1.54569

Implementation of the education

Structure of the education

The academic year division in semesters, periods etc. are described in KTH’s regulatory framework http://intra.kth.se/regelverk/utbildning-forskning/allmant/1.27175

The first two years consists of compulsory conditionally elective courses. These are scheduled so that primarily two courses are read and completed in the same period.

School year three has two compulsory courses of which one is an advanced study project, that also can be used as degree project for a Bachelor of Science degree, and one conditionally elective course. A course on research methodology or theory of science on advanced level of at least 7,5 HE credits is mandatory.

The courses in school year 1-3 should help the student to acquire a solid foundation of: mathematics/natural sciences, basic technological sciences and professional skills. In school year three the first elective courses are chosen and the choice of specialization for the second cycle is made.

The guiding principle for specializations on the IT-programme is to make use of KTH's Master's programmes in the following way as far as possible:

The courses of the Master's programme are read in school year 4 and 5

Possible pre-requisites for respective Master's programmes are read in school year 3, compulsory courses on the Master's programme become compulsory courses for students on the IT-programme.

Some courses can be excluded if they overlap with compulsory courses on the IT-programme. Apart from a degree project, at least 60 HE credits should come from second-cycle courses from the Master which fall within the field of technology of the IT-programme.

A course in Theory of Science/Research Methodology equivalent to II2202 Research Methodology and Scientific Writing is mandatory.

Foreign languages

Within the IT-programme it is possible to study language courses in parallel with other courses. For students selecting this possibility it is recommended that the student study abroad for an exchange period during year 4 or 5 in a country where the language in question is spoken and is used as language of instruction at the receiving university. Students are also recommended to study one semester abroad during year 3. Students are not allowed to start their language courses until they have proven their ability to follow the mandatory and conditionally elective courses in year 1, i.e. the language courses normally can be elected from year 2. Students may take an elective realia course on 4.5 HE in year 1.

For the European languages it is recommended that the language courses are distributed as 7.5 + 7.5 HE credits in years 2 and 3 and an additional 7.5 + 7.5 HE credits during year 4 and 5. The degree project can be performed abroad or in Sweden. The examiner should be an authorized teacher at KTH.

Students studying foreign languages are strongly recommended to select one of the master programmes that do not require any additional pre-requisite courses as specialization for year 4 and 5. This allows the language courses to be included entirely within the 300 HE credits required for a degree.
Courses
The programme is course-based. Lists of courses are included in appendix 1.

The programme is course-based. Lists of courses are included in appendix 1. Courses are either compulsory, conditionally elective or elective. For year 1-3 there are two sets of conditionally elective courses labeled “MatNat block” and “IT block”. For a degree it is required that at least 31.5 HE credits of courses from the “MatNat block” and 45 HE credits of courses from the “IT block” has been completed.

It is recommended that the space for elective courses within the programme is used to study pre-requisite courses for the selected Master in case there are such requirements. Pre-requisite courses for the Master programmes are listed in appendix 1.

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
Semantic registration
All students following an education programme at KTH must register for each semester with the exception of the first semester for which registration is performed automatically. Registration per semester is performed by the student through the personal menu at www.kth.se. Semester registration is necessary for enabling the registration of results from the studies and is a pre-requisit for granted student finance payment (CSN medel).

Course selection
Course selection is made by the student for the upcoming semester from the spring semester of year 1.

The rules for promotion to the next school year for the IT-programme are:

- From school year 1 to school year 2 - 45 HE credits passed from school year 1.
- From school year 2 to school year 3 - 90 HE credits passed from school year 1 and 2, of which at least 50 HE credits from school year 1.
- From school year 3 to school year 4 - 150 HE credits passed from school year 1, 2 and 3, of which at least 110 HE credits from school year 1 and 2. The advanced study project course of 15 HE credits must be completed.

Choice of Master's programme takes place before school year 4.

Individual study plan
Students who do not meet the rules for promotion to the next school year study according an individual study plan. This plan should be designed so that priority is given to unfinished courses in the years one, two and three, of the education respectively.

Recognition of previous academic studies
Student that has read some/some courses at another university or higher education institution can apply to transfer the credits the IT-programme. The transferred courses may not overlap with any course already read at KTH.

To exchange a compulsory course, documented knowledge of at least the same extent for the equivalent subject must be demonstrated.
Application documents for transfer or change of courses should be delivered to the study adviser for assessment and decision by the programme co-ordinator of the IT-programme. To the application should be enclosed attested copies of academic transcripts for invoked courses and course descriptions (course syllabus). Decisions for such applications are normally available within a couple of weeks from the date of the application. A copy of the decision is always mailed to the applicant.

Reference to the policy that is in KTHs regulatory framework http://intra.kth.se/regelverk/utbildning--forskning/grundutbildning.

**Studies abroad**

To be qualified for exchange studies within the scope of the agreements that have with select foreign universities the following apply:

- Students in school year 2 may not have more than two courses unfinished
- Students in school year 3 may not have more than three courses unfinished

The KTH student selection criteria apply. Reference to the selection criteria in KTH's regulatory framework http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning

**Degree project**

For engineering degree, a degree project of 30 HE credits within the field of technology should be carried out. The degree project is normally carried out at the end of the education and cannot be started, until the student has achieved at least 240 HE credits within the education. The degree project should be carried out within the chosen Master’s programme.

The selection of a suitable of degree project is made in consultation with the examiner.

The degree project is graded P/F (Pass/Fail). In order to pass, the degree project (in the higher education ordinance called independent work) must show high quality as tested against the relevant examination objectives, often all national examination objectives. At the School of Information- and communication technology, the term independent work is interpreted such that the degree project at advanced level (master level) is performed individually.

Directives and criteria for passing and grading, are available at:


Specific directives and criteria for grading are available in the official course syllabus.

**Degree**

The conditions for higher education qualification are satisfied, in that the course requirements in the program are satisfied.

The description of the higher education qualification is Engineering degree. In the degree certificate, the study programme that the student has gone through is stated.

The application for degree is made through the Personal menu at www.kth.se.

Reference to KTH's regulatory framework http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning

Appendix 1 - Course list
Appendix 2 - Programme syllabus descriptions
Appendix 1: Course list

Degree Programme in Information and Communication Technology (CINTE), Programme syllabus for studies starting in autumn 2016

General courses

Year 1

Mandatory courses (30.0 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID1018</td>
<td>Programming I</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>II1304</td>
<td>Engineering Skills for ICT</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>IS1200</td>
<td>Computer Hardware Engineering</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1610</td>
<td>Discrete Mathematics</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1610</td>
<td>Mathematics, Basic Course</td>
<td>4.5</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

Conditionally elective courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE1204</td>
<td>Digital Design</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>IE1206</td>
<td>Embedded Electronics</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1624</td>
<td>Algebra and Geometry</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1625</td>
<td>Calculus in One Variable</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

Supplementary information

The conditionally elective courses are to be treated as mandatory courses. Due to pre-requisites for the mandatory courses the only real options for selecting courses in year 1-3 are the following:

- ME1003 Industrial Economics can be replaced by a language course (N.B. ME1003 is pre-requisite for some master programmes).
- If the student is targeting a more hardware/physics oriented master programme it is recommended to take SF1626 Calculus in Several Variable. If the student is targeting a more software master programme one can select DD1351 Logic for Computer Science.

The application for degree is reviewed according to the study programme.
Language Courses

The language courses offered by KTH in chinese, japanese, german, french, spanish and brasilian portugese can be selected as elective courses. Information about the language courses can be found at www.kth.se/language.

Year 2

Mandatory courses (15.0 credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>II1304</td>
<td>Engineering Skills for ICT</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td></td>
<td>1.5 cr belong to study year 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IK1203</td>
<td>Networks and Communication</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

Conditionally elective courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID1019</td>
<td>Programming II</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ID1020</td>
<td>Algorithms and Data Structures</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>II1305</td>
<td>Project in Information and Communication Technology</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>IV1303</td>
<td>Modern Software Development</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>LI1014</td>
<td>Management of Scientific Literature</td>
<td>3.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME1003</td>
<td>Industrial Management, Basic Course</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1626</td>
<td>Calculus in Several Variable</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>SK1118</td>
<td>Electromagnetism and Waves</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

Supplementary information

The conditionally elective courses are to be treated as mandatory courses. Due to pre-requisites for the mandatory courses the only real options for selecting courses in year 1-3 are the following:

- ME1003 Industrial Economics can be replaced by a language course (N.B. ME1003 is pre-requisite for some master programmes).
- If the student is targeting a more hardware/physics oriented master programme it is recommended to take SF1626 Calculus in Several Variable. If the student is targeting a more software master programme one can select DD1351 Logic for Computer Science.

The application for degree is reviewed according to the study programme.

Language Courses

The language courses offered by KTH in chinese, japanese, german, french, spanish and brasilian portugese can be selected as elective courses. Information about the language courses can be found at www.kth.se/language.
### Year 3

**Mandatory courses (43.5 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG1815</td>
<td>Sustainable Development, ICT and Innovation</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ID1206</td>
<td>Operating Systems</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>II1304</td>
<td>Engineering Skills for ICT</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>II143X</td>
<td>Degree Project in Information and Communication Technology, First Cycle</td>
<td>15.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>SF1912</td>
<td>Probability Theory and Statistics</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

**Optional courses**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD2350</td>
<td>Algorithms, Data Structures and Complexity</td>
<td>9.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DD2352</td>
<td>Algorithms and Complexity</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>DD2401</td>
<td>Neuroscience</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>EL1000</td>
<td>Automatic Control, General Course</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>EQ1110</td>
<td>Continuous Time Signals and Systems</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>EQ1120</td>
<td>Discrete Time Signals and Systems</td>
<td>6.0</td>
<td>First cycle</td>
</tr>
<tr>
<td>IC1007</td>
<td>Human-computer Interaction: Principles and Design</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ID1212</td>
<td>Network Programming</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ID1214</td>
<td>Artificial Intelligence and Applied Methods</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ID1217</td>
<td>Concurrent Programming</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ID1354</td>
<td>Internet Applications</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ID2201</td>
<td>Distributed Systems, Basic Course</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ID2202</td>
<td>Compilers and Execution Environments</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ID2213</td>
<td>Logic Programming</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ID2216</td>
<td>Developing Mobile Applications</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IE1202</td>
<td>Analog Electronics</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>IH1611</td>
<td>Semiconductor Devices</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>IK1552</td>
<td>Internetworking</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>IK2206</td>
<td>Internet Security and Privacy</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IL1331</td>
<td>VHDL Design</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>Course code</td>
<td>Course name</td>
<td>Credits</td>
<td>Edu. level</td>
</tr>
<tr>
<td>-------------</td>
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</tr>
<tr>
<td>IS2202</td>
<td>Computer Systems Architecture</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IV1013</td>
<td>Introduction to Computer Security</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>IV1350</td>
<td>Object Oriented Design</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>IV1351</td>
<td>Data Storage Paradigms</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>ME2015</td>
<td>Project Management: Leadership and Control</td>
<td>6.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2063</td>
<td>Team Leadership and Human Resource Management</td>
<td>6.0</td>
<td>Second cycle</td>
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<tr>
<td>SF1545</td>
<td>Numerical Methods, Basic Course</td>
<td>6.0</td>
<td>First cycle</td>
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<tr>
<td>SF1546</td>
<td>Numerical Methods, Basic Course</td>
<td>6.0</td>
<td>First cycle</td>
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<td>SF1547</td>
<td>Numerical Methods, Basic Course</td>
<td>6.0</td>
<td>First cycle</td>
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<tr>
<td>SG1102</td>
<td>Mechanics, Smaller Course</td>
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<td>First cycle</td>
</tr>
<tr>
<td>SH1011</td>
<td>Modern Physics</td>
<td>7.5</td>
<td>First cycle</td>
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### Conditionally elective courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD1351</td>
<td>Logic for Computer Scientists</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
</tbody>
</table>

### Supplementary information

The conditionally elective courses are to be treated as mandatory courses. Due to pre-requisites for the mandatory courses the only real options for selecting courses in year 1-3 are the following:

- ME1003 Industrial Economics can be replaced by a language course (N.B. ME1003 is pre-requisite for some master programmes).
- If the student is targeting a more hardware/physics oriented master programme it is recommended to take SF1626 Calculus in Several Variable. If the student is targeting a more software master programme one can select DD1351 Logic for Computer Science.

The application for degree is reviewed according to the study programme.

### Language Courses

The language courses offered by KTH in chinese, japanese, german, french, spanish and brasilian portugese can be selected as elective courses. Information about the language courses can be found at www.kth.se/language.

### Year 4

#### Supplementary information

Kompletterande information årskurs 4-5:  
Årskurs 4-5 på civilingenjörsprogrammets inriktningar motsvarar årskurs 1-2 på ett masterprogram. För detaljinformation om masterprogrammen och ingående kurser se respektive masterprograms beskrivning på KTHs webb http://www.kth.se/utbildning/program/master-magisterutbildning.
Masterprogrammen omfattar 120 högskolepoäng. Av dessa är 30 hp för examensarbetet och 90 hp kurser. Civilingenjörsstudenter skall läsa minst 60 hp teknikkurser på avancerad nivå av master programmets kurser inklusive en kurs i forskningsmetodik (t.ex. II2202) för att kunna räkna det till inriktningen. OBS! Endast en kurs i forskningsmetodik kan ingå i examen.

För att få läsa Industriell ekonomi (TINEM) som inriktning gäller följande (för att examensordning och högskoleförordningens krav för examen skall uppfyllas):

- minst 60 hp kurser inom TINEM måste läsas.
- minst 30 hp teknikkurser ur de obligatoriska kurserna på ett av följande masterprogram måste läsas:
  Programvaruteknik för distribuerade system (TSEDM), Kommunikationssystem (TCOMM), Inbyggda system (TEBSM).
- Exjobbet på avancerad nivå måste vara kvalificerat både som exjobb på TINEM och som exjobb inom CINTEs teknikområde.
- Examensarbetet och valet av teknikkurser skall, i fallet att vald master är TINEM, godkännas innan de påbörjas av både programansvarig för TINEM och för CINTE. Detta görs i en så kallad individuell studieplanering.


För varje masterprogram baseras de behörighetsgivande kurserna på antagandet att studenten läst samtliga obligatoriska kurser i årskurs 1-3 samt följande villkorligt valfria kurser:

"IT blocket":
- Samtliga kurser.

"MatNat blocket":
- SF1624 Algebra och geometri
- SF1625 Envariabelanalys
- SF1626 Flervariabelanalys
- IF1613/SK1118 Elektromagnetism och vågrörelselära.

För närvarande mappas följande masterprogram för CINTE:
- Datalogi (TCSCM)
- ICT Innovation (TIVNM)
- Information- och nätverksteknologi (TINNM)
- Inbyggda system (TEBSM)
- Industriell ekonomi (TINEM)
- Interaktiv medieteknik (TIMTM)
- Kommunikationssystem (TCOMM)
- Maskininlärning (TMAIM)
- Medicinsk teknik (TMLEM)
- Programvaruteknik för distribuerade system (TSEDM)
- Systemteknik och robotik (TSCRM)
### Year 5

**Mandatory courses (7.5 credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>II2202</td>
<td>Research Methodology and Scientific Writing</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td></td>
<td><em>Or equivalent.</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Supplementary information**

**Kompletterande information årskurs 4-5:**


Masterprogrammen omfattar 120 högskolepoäng. Av dessa är 30 hp för examensarbetet och 90 hp kurser. Civilingenjörstudenter skall läsa minst 60 hp teknikkurser på avancerad nivå av master programmets kurser inklusive en kurs i forskningsmetodik (t.ex. II2202) för att kunna räkna det till inriktningen. OBS! Endast en kurs i forskningsmetodik kan ingå i examen.

För att få läsa Industriell ekonomi (TINEM) som inriktning gäller följande (för att examensordning och högskoleförordningens krav för examen skall uppfyllas):

- minst 60 hp kurser inom TINEM måste läsas.
- minst 30 hp teknikkurser ur de obligatoriska kurserna på ett av följande masterprogram måste läsas: Programvaruteknik för distribuerade system (TSEDM), Kommunikationssystem (TCOMM), Inbyggda system (TEBSM).
- Exjobbet på avancerad nivå måste vara kvalificerat både som exjobb på TINEM och som exjobb inom CINTEs teknikområde.
- Examensarbetet och valet av teknikkurser skall, i fallet att vald master är TINEM, godkännas innan de påbörjas av både programansvarig för TINEM och för CINTE. Detta görs i en så kallad individuell studieplanering.


För varje masterprogram baseras de behörighetgivande kurserna på antagandet att studenten läst samtliga obligatoriska kurser i årskurs 1-3 samt följande villkorligt valfria kurser:

"IT blocket":

- Samtliga kurser.

"MatNat blocket":

- SF1624 Algebra och geometri
- SF1625 Envariabelanalys
- SF1626 Flervariabelanalys
- IF1613/SK1118 Elektromagnetism och vågrörelselära.

För närmare mappas följande masterprogram för CINTE:

- Datalogi (TCSCM)
- ICT Innovation (TIVNM)
- Information- och nätverksteknologi (TINNM)
- Inbyggda system (TEBSM)
- Industriell ekonomi (TINEM)
- Interaktiv medieteknik (TIMTM)
- Kommunikationssystem (TCOMM)
- Maskininlärning (TMAIM)
- Medicinsk teknik (TMLEM)
- Programvaruteknik för distribuerade system (TSEDM)
- Systemteknik och robotik (TSCRM)

**Individual (IND)**

Year 1

Year 2

Year 3

Year 4

Year 5
Appendix 2: Specialisations

Degree Programme in Information and Communication Technology (CINTE), Programme syllabus for studies starting in autumn 2016

**Individual (IND)**