Programme syllabus

Master's Programme, Transport and Geoinformation Technology, 120 credits
Masterprogram, transport och geoinformatik
120.0 credits

Valid for students admitted to the education from autumn 15 (HT - Autumn term; VT - Spring term).

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

Programme objectives

The information is valid for students who started the program academic year 2015/2016. Later decisions may affect year 2 in the program. Please look at www.kth.se/studies?l=en_UK for further information.

Knowledge and understanding

After completing the programme the students will:

- Have knowledge about collecting, structuring, storing, analysing and visualisation of geospatial and transport data.
- Have knowledge about analysis, planning, assessment, and operations of transport systems and other urban and regional phenomena at different spatial levels.

Skills and abilities

After completing the programme, the students will acquire practical skills to:

- Process the measured data using appropriate mathematical tools
- Structure and visualize geospatial data using information technology
- Model transport or geospatial phenomena using appropriate decision support tools
- Solve complex problems and present decision support for policy-makers and the general public.

The programme also aims to help students develop capability to conduct independent, scientific research through critical analysis and synthesis. Students will receive training in scientific communication and presentation, both oral and in written form. Students will also learn how to work in project form and work in groups.
**Ability to make judgements and adopt a standpoint**

After completing the programme, the students will be able to:

- Choose proper method for data collection and analysis according to the requirements of given problem
- Assess the possibilities and limitations of decision support tools and their applications in different scientific and technological branches
- Identify the needs for new or the further development of existing methods, technologies and algorithms used in the process of collection, storing, analysing and visualisation of geospatial and transport data
- Apply a systems view of thinking and critically analyse the subject area’s tools of analysis and modelling.

**Extent and content of the programme**

The duration of the programme is two years which correspond to 120 credits of higher education: three semesters of course work (90 credits) and one semester (30 credits) of a Degree Project.

The education is at the advanced level (second cycle). The literature and all other course material are in English, which also is the teaching language. There are presently no specialisations.

**Eligibility and selection**

The general admission requirement for masters programmes at KTH is a completed Bachelor's degree, equivalent to a Swedish Bachelor's degree (180 ECTS), or equivalent academic qualifications from an internationally recognised university. English language proficiency equivalent to (the Swedish upper secondary school) English course B/6. In addition, students have to meet following specific requirements:

- Bachelor degree (180 credits) with a specialisation in civil engineering, urban planning, environmental science, geodesy, geographic information systems, computer science, or another field with a clear relevance to the program.
- At least 60 credits in transport engineering and planning, geomatics, physics, computer science, statistics, and/or mathematics, of which at least 6.0 credits per course should be in each of:
  - Computer programming,
  - Linear algebra,
  - One of geographic information systems, database technology, or geodetic surveying,
  - Mathematical statistics, and
  - Single-variable calculus.

**Selection**

If the number of applicants should exceed the number of places available, a selection process will be conducted.

The selection process is based on the following selection criteria: University, previous studies (for instance GPA, grades in specific subjects and English), motivation for the studies (for instance letter of motivation, references, thesis proposal and relevant work experience). The evaluation scale is 1-75.
Implementation of the education

Structure of the education

The academic year is 40 weeks and is divided into two semesters, autumn and spring. Each semester consists of two study periods. For information on the extent of the school year, the exam period and the re-exam period see http://www.kth.se/student/schema.

Courses

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

A prerequisite for a students' participation in studies at KTH is that the student performs a course registration and semester registration for each semester.

Before the first semester you are automatically registered in connection with enrollment in the semester. Before the second, third and fourth semester students must register online. Registration is done under the personal menu on the KTH:s webb page.

Course registration is done by all students on the program www.antagning.se.

Recognition of previous academic studies

Students are able to apply to receive credit for the results of the course/courses at another college/university within the country or abroad.

For more information please refer to KTH's regulations in www.kth.se and program's student guidance counselling.

Studies abroad

There are opportunities for exchange within the programme under existing agreements.

For more information and recommendation on the appropriate semester for exchange studies refer to the program's international administrators.

Degree project
The Degree Project (30 credits) is compulsory in order to complete a Master Degree at KTH. Students can choose between the Master’s Projects listed in Appendix 1. The prerequisite for starting the Degree Project is that they have completed the programme’s courses corresponding to 60 credits. Additional details for how the degree project should be carried out can be found in the KTH regulations.

Information regarding the grading scale on the degree refer to the syllabus.

Degree

To obtain master's degree students must have passed courses of at least 120 higher education credits, of which the following must be included:

- at least 90 ECTS at advanced level including mandatory and conditionally elective courses and a 30-credit degree project within the master programme

in addition is allowed:

- a maximum of 15 ECTS from courses in any engineering area at basic or advanced level
- a maximum of 15 ECTS of entirely elective courses

In the event that the master's program is a final part of the degree programme in Civil Engineering and Urban Management or of the degree programme in Energy and Environment, there may be additional requirements according to the corresponding study programmes. For example, a master of science degree in the above degree programmes should include mathematics and science subjects for a minimum of 45 higher education credits.

Application for Degree

The application for degree is done under the personal menu on KTH:s webb page.

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

Master's Programme, Transport and Geoinformation Technology, 120 credits (TTGTM), Programme syllabus for studies starting in autumn 2015

General courses

Year 1

Mandatory courses (12.0 Credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG2429</td>
<td>Geovisualization</td>
<td>6.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2177</td>
<td>Transport and Geodata Analysis</td>
<td>6.0 hp</td>
<td>Second 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>AG2411</td>
<td>GIS Architecture and Algorithms</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG2414</td>
<td>Spatial Analysis</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG2416</td>
<td>Advanced Remote Sensing</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG2425</td>
<td>Spatial Databases</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG2925</td>
<td>Geodata Quality</td>
<td>3.0 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2171</td>
<td>Traffic Engineering and Management</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2173</td>
<td>Public Transport</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2301</td>
<td>Transport Policy and Evaluation</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2303</td>
<td>Transport and Sustainable Development</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2307</td>
<td>Urban Modeling and Decision Support</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2923</td>
<td>Global Navigation Satellite Systems (GNSS)</td>
<td>7.5 hp</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

Year 2
### Mandatory courses (15.0 Credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK2036</td>
<td>Theory and Methodology of Science with Applications (Natural and Technological Science)</td>
<td>7.5 hp  Second cycle</td>
</tr>
<tr>
<td>AK2038</td>
<td>Theory and Methodology of Science with Applications (Social Science)</td>
<td>7.5 hp  Second cycle</td>
</tr>
</tbody>
</table>

### Conditionally elective courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG2417</td>
<td>Web and Mobile GIS</td>
<td>7.5 hp  Second cycle</td>
</tr>
<tr>
<td>AG2421</td>
<td>A GIS Project</td>
<td>7.5 hp  Second cycle</td>
</tr>
<tr>
<td>AG243X</td>
<td>Degree Project in Geoinformatics, Second Cycle</td>
<td>30.0 hp Second cycle</td>
</tr>
<tr>
<td>AG293X</td>
<td>Degree Project in Geodesy, Second Cycle</td>
<td>30.0 hp Second cycle</td>
</tr>
<tr>
<td>AH2026</td>
<td>Railway Traffic - Market and Planning, Basic Course</td>
<td>7.5 hp  Second cycle</td>
</tr>
<tr>
<td>AH203X</td>
<td>Degree Project in Transport Science, Second Cycle</td>
<td>30.0 hp Second cycle</td>
</tr>
<tr>
<td>AH204X</td>
<td>Degree Project in Railway and Rail Traffic, Second Cycle</td>
<td>30.0 hp Second cycle</td>
</tr>
<tr>
<td>AH2102</td>
<td>Logistics and Transportation</td>
<td>7.5 hp  Second cycle</td>
</tr>
<tr>
<td>AH2174</td>
<td>Traffic Simulation Modelling and Applications</td>
<td>7.5 hp  Second cycle</td>
</tr>
<tr>
<td>AH222X</td>
<td>Degree Project in Systems Analysis and Economics, Second Cycle</td>
<td>30.0 hp Second cycle</td>
</tr>
<tr>
<td>AH2314</td>
<td>Individual Choice Modeling and Market Analysis</td>
<td>7.5 hp  Second cycle</td>
</tr>
<tr>
<td>AH2915</td>
<td>Laser Scanning Technology</td>
<td>7.5 hp  Second cycle</td>
</tr>
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### Supplementary information

One of the courses in Theory and Methodology of science is mandatory.
Appendix 2: Specialisations

Master's Programme, Transport and Geoinformation Technology, 120 credits (TTGTM), Programme syllabus for studies starting in autumn 2015

This programme has no specialisations.