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 17 (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 2016/2017. Later decisions may affect year 2 in the program. Please look at www.kth.se/studies?l=en_UK for further information.

The aim of the program is to provide students with advanced knowledge in areas of transportation science and geoinformatics and prepare them for further education and research. Students will be trained to work independently, take initiative and create new ideas for a sustainable society. Students will gain knowledge, skills and abilities to plan and maintain sustainable transport systems and to collect, visualize and analyze geographic data. In addition to the objectives specified in the Higher Education are the specific objectives of this program.

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 regarding the biological, sociological and economic sustainability.

Skills and abilities

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

- Be able to formulate and analyze the role of technology for sustainable development
- 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; 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). Language of instructions is English.

**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 3.0 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.

Applicants who at the time of application have no degree certificate of at least 180 credits, may be granted conditional admission. Conditional admission granted if the above requirements of the degree are expected to be fulfilled by the time of registration. A Certificate from university /college, proving that the student is enrolled in a study program which if completed will lead to the degree must accompany the notification.

**Selection**

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.

Information regarding the scale found in the curriculum.
Conditions for participation in the programme

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

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.

The thesis work is graded pass (P) or fail (F).

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 30 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 2017

General courses

Year 1

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</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG2412</td>
<td>Geovisualisation</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG2413</td>
<td>Digital Image Processing and Applications</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG2414</td>
<td>Spatial Analysis</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG2425</td>
<td>Spatial Databases</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG2926</td>
<td>Map Projections and Reference Systems</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2026</td>
<td>Railway Traffic - Market and Planning, Basic Course</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2170</td>
<td>Transport Data collection and Analysis</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2171</td>
<td>Traffic Engineering and Management</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2173</td>
<td>Public Transport</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2301</td>
<td>Transport Policy and Evaluation</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2303</td>
<td>Transport and Sustainable Development</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2307</td>
<td>Urban Modeling and Decision Support</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2923</td>
<td>Global Navigation Satellite Systems (GNSS)</td>
<td>7.5</td>
<td>Second cycle</td>
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</table>

Year 2

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>AH2178</td>
<td>Research Methodology and Communication Skills</td>
<td>7.5</td>
<td>Second cycle</td>
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</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>AG2417</td>
<td>Web and Mobile GIS</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG2421</td>
<td>A GIS Project</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG243X</td>
<td>Degree Project in Geoinformatics, Second Cycle</td>
<td>30.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG2927</td>
<td>Geodata Quality and Adjustment Theory</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG2927</td>
<td>Geodata Quality and Adjustment Theory</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AG293X</td>
<td>Degree Project in Geodesy, Second Cycle</td>
<td>30.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2029</td>
<td>Railway Signalling System</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH203X</td>
<td>Degree Project in Transport Science, Second Cycle</td>
<td>30.0</td>
<td>Second cycle</td>
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<tr>
<td>AH204X</td>
<td>Degree Project in Railway and Rail Traffic, Second Cycle</td>
<td>30.0</td>
<td>Second cycle</td>
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<tr>
<td>AH2102</td>
<td>Logistics and Transportation</td>
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<td>Second cycle</td>
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<tr>
<td>AH2174</td>
<td>Traffic Simulation Modelling and Applications</td>
<td>7.5</td>
<td>Second cycle</td>
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<tr>
<td>AH222X</td>
<td>Degree Project in Systems Analysis and Economics, Second Cycle</td>
<td>30.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2314</td>
<td>Individual Choice Modeling and Market Analysis</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>AH2915</td>
<td>Laser Scanning Technology</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
</tbody>
</table>

### Year 3

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Appendix 2: Specialisations

Master's Programme, Transport and Geoinformation Technology, 120 credits (TTGTM), Programme syllabus for studies starting in autumn 2017

This programme has no specialisations.