Programme syllabus

Master's Programme, Network Services and Systems, 120 credits
Masterprogram, nätverkstjänster och system
120.0 credits

Valid for students admitted to the education from autumn 07 (HT - Autumn term; VT - Spring term).

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

Programme objectives

Knowledge and understanding

After the program, the student shall know and understand:

- The scientific fundamentals and practical applications of computer communication for both wired and wireless networks.
- Protocol models and their realization, primarily the Internet protocols.
- Queuing theory, simulation methodology, traffic measurements and systems experimentation for functional and performance evaluation.
- Scientific methodology and its application on the field of the program.

Skills and abilities

After the program, the student shall be able to

- mathematically analyze network functions and protocols,
- specify, design and construct parts of communication systems and to implement them in software,
- present technical systems and results from studies both orally and in writing, as well as to hold demonstrations of systems,
- work independently and in group, to plan and lead work, critically evaluate the quality of one’s work and to be able to continuously improve it,
- read and understand research results within the field and to apply the results.

Ability to make judgements and adopt a standpoint

After the program, the student shall

- apply a scientific approach to his or her own technical work,
be conscious of the possibilities and limitations of technology, its role in society and how it is being used nationally and internationally, be aware of ethical issues concerning research and development.

Reference to the local degree policy of the Royal Institute of Technology: The KTH-Handbook 2, section 19.1.

**Extent and content of the programme**

The program is at the advanced level of the Swedish university structure and comprises two years of full time study, corresponding to 120 ECTS credits. The program is entirely taught in English.

**Eligibility and selection**

Applicants must have completed a Bachelor's degree in engineering, science, or mathematics, equivalent to at least 180 ECTS credits. It should include: at least 60 ECTS credits of course work in electrical engineering, computer engineering or computer science; at least 30 ECTS credits course work in mathematics, including calculus, linear algebra and mathematical statistics. The applicant must have passed with distinction courses in programming in C or Java, operating systems and signals and systems. It is recommended that applicants have experience in solving problems using computational software, particularly MATLAB. For all program at KTH where English is the language of instruction, the specific eligibility requirement is English B or equivalent. Reference to the local admission policy of the Royal Institute of Technology: the KTH-Handbook 2, section 11.0-11.9.

**Implementation of the education**

**Structure of the education**

The program extends over two academic years. Each academic year spans 40 weeks and it is divided into and four seven-weeks long study periods. Each study period is concluded by an examination period of between two and five days. There are three extra examination periods for make-up exams following Christmas, following the ordinary examinations in May and immediately before the start of the study period of the academic year. The education in the program consists of a course block and a master’s thesis project. The courses are studied during the first six study periods and comprise an introduction to the field, its work methods and systems, as well as an introduction to scientific methodology. The program is concluded by the thesis project that comprises 30 ECTS credits, a full semester of work.

**Courses**

The programme is course-based. Lists of courses are included in appendix 1.

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**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.
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**Conditions for participation in the programme**

Conditions for being promoted to the next academic year is the successful completion of minimally 45 ECTS credits; to commence the thesis work, a minimum of 75 ECTS credits must be successfully completed.

**Recognition of previous academic studies**

For a description of the conditions of receiving credit for previous studies according to the policy of the Royal Institute of Technology, we refer to the KTH policy in the KTH-Handbook 2, section 13.3.

**Degree project**

The MS thesis project comprises 30 ECTS credits of work and a major part of the course work, a minimum of 75 ECTS credits, must have been completed before the project may commence. The project may be conducted individually or in collaboration with one other student and the topic of the project must provide an in-depth study within the field of the program. The thesis is graded on a scale from A to F. A-E are passing grades, A is the highest grade. The evaluation criteria, which are common to all of KTH, are the technical and scientific contents, the work process and the presentation of the project at the conclusion. Reference: the KTH-Handbook 2, section 15.1-15.6.

**Degree**

The master’s degree is given after a successful completion of the program. The degree is named ”Teknologiemasterexamen”. The diploma states the program that the student has completed. Reference to the local degree policy: the KTH-Handbook 2, section 19.1.

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

Master's Programme, Network Services and Systems, 120 credits (TNSSM), Programme syllabus for studies starting in autumn 2007

General courses

Year 1

Mandatory courses (67.5 Credits)

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP2910</td>
<td>Communication Networks I</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>EP2920</td>
<td>Communication Networks II</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>EP2930</td>
<td>Queuing Theory</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>EP2940</td>
<td>Internet Services and Traffic Measurements</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>EP2950</td>
<td>Wireless Networks</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>EP2960</td>
<td>Programming of Mobile Services</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>EP2970</td>
<td>Simulation of Communication Networks</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>EP2980</td>
<td>Wireless Sensor Networks</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>EP2990</td>
<td>Routing in IP Networks</td>
<td>7.5 hp Second cycle</td>
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</tbody>
</table>

Year 2

Mandatory courses (60.0 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>EP2210</td>
<td>Performance Analysis of Communication Networks</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>EP2300</td>
<td>Management of Networks and Networked Systems</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>EP2400</td>
<td>Network Algorithms</td>
<td>7.5 hp Second cycle</td>
</tr>
<tr>
<td>EP240X</td>
<td>Degree Project in Communication Networks, Second Cycle</td>
<td>30.0 hp Second cycle</td>
</tr>
</tbody>
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Appendix 2: Specialisations

Master's Programme, Network Services and Systems, 120 credits (TNSSM), Programme syllabus for studies starting in autumn 2007

This programme has no specialisations.