Programme syllabus

Master's Programme, Security and Mobile Computing, 120 credits
Masterprogram, säker och mobil kommunikation
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 program is organized by a consortium of five European universities in five different countries, where KTH is one of the partners in the consortium. The students spend the first year in one country and the second year in one of the other four countries. After completing the two years, the students are awarded double degrees from the two universities they attended. The name of the program used by the consortium is NordSecMob - Master's Programme in Security and Mobile Computing. The conditions for the education and the requirements for a double degree are determined in a consortium agreement between the rectors of the universities in the consortium. The KTH part of this program is closely related to the Master’s programme in Communication Systems at KTH, and most of the courses are common among the programmes.

Knowledge and understanding

For a Master’s degree in Security and Mobile Computing the student shall:

- Show knowledge and understanding in the area of Security and Mobile Computing, comprising a wide knowledge of the area as well as more profound knowledge of some parts of the area, and insight into current research and development work.
- Show in-depth knowledge about methodology in Security and Mobile Computing.
- Identify and describe examples of sustainability aspects related to Security and Mobile Computing.
- Give examples of and explain social, ethical and environmental aspects of sustainable development in the area of Security and Mobile Computing.

Skills and abilities

For a Master’s degree in Security and Mobile Computing the student shall:

- Show ability to critically and systematically integrate knowledge and to analyze, evaluate and handle complex occurrences, issues and situations even with limited information.
- Show ability to critically, independently and creatively identify and formulate issues, to plan and with adequate methods perform qualified tasks within given time limits and thereby contribute to the evolution of knowledge as well as asses the work.
- Show ability, in domestic and international venues, to orally and in writing present and discuss conclusions and the knowledge and the arguments on which these are based, in dialogue with different groups.
- Show such skills which are required for participation in research and development work or in other independent work of a qualified nature.
- Based on various definitions of sustainable development illustrate and point out perspectives where progress within Security and Mobile computing can be relevant for sustainable development in society.
Ability to make judgements and adopt a standpoint

For a Master’s degree in Security and Mobile Computing the student shall:

- Show ability to make assessments taking into account relevant scientific, societal and ethic aspects as well as show awareness of ethical aspects of research and development work.
- Show ability to compare and evaluate possibilities and limitations of communication technology in the society and how communication technology is used from a sustainability perspective.
- Show insight into the possibilities and limitations of science, its role in society and the responsibility of humans for its use.
- Show ability to identify her/his need for additional knowledge and take responsibility for the development of his /her own knowledge.

See local degree policy of the Royal Institute of Technology in KTH Regulations.

Extent and content of the programme

The educational program comprises two years, and a Master’s degree is awarded after completion of the course requirements of 120 hp.

The education is on the advanced level (second cycle).

All students follow the same line of study.

The language of the entire education is English.

Eligibility and selection

The basic requirement for admission to a Master’s program at advanced level is a national university degree at basic level (first cycle) of at least 180hp or an equivalent international degree.

A good knowledge of written and spoken English is required.

The admission criteria to the programme is a high quality Bachelor's degree encompassing a minimum of 180 ECTS credits in Engineering (Computer Science or Information technology) or equivalent studies, i.e., must be a degree of at least three years of full-time studies. The applicants should have solid knowledge of mathematics (discrete mathematics), programming skills, data structures and algorithms, computer architecture and basics of computer networks. In addition, a basic knowledge of following subject areas will be an advantage: databases and database management, principles of theoretical computer science, logic in computer science, software engineering, operating systems, and concurrent programming.

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.

See local admission policy of KTH Royal Institute of Technology.

Implementation of the education

Structure of the education

The programme consists of two academic years, each comprising about 9 months and divided into two terms with two study periods per term. Each study period ends in an examination period.
The programme has 45 credits compulsory courses, a 30 credit Master’s thesis and 45 credits conditionally elective courses. Compulsory courses cover Internetworking, Network Security, Communication systems and Research Methodology. Three blocks of elective courses are: in Internetworking, in Wireless systems, in Communication Systems Security and in Entrepreneurship. It is mandatory to choose one project oriented course in the elective part. The Master’s thesis project is typically carried out in the last term.

**Courses**

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

The courses are either compulsory or conditionally elective. After application, students may be allowed to take extra courses in addition to the compulsory or conditionally elective courses.

**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.

At KTH a grading scale with seven levels A-F is used for final grades in advanced level courses and for the thesis. A-E are passing grades where A is the highest grade.

The grades pass (P) and fail (F) are for partial grades in some courses, for example for laboratory assignments, and as final grades in small conditionally elective courses.

**Conditions for participation in the programme**

Each student who has been admitted to the Master’s program in Security and Mobile Computing is admitted to the compulsory courses belonging to a specific program term after registration on this term.

Conditionally elective courses are chosen by the student prior to the second term of the first year and prior to each of the two terms of the second year. The choice is limited to the courses stated as conditionally elective in the course list.

Students who are term-registered are considered as expected students in all compulsory courses and in chosen elective courses. Students announce their participation in an individual course to the teacher responsible for the course in the beginning of the course. Students announce possible interruptions in their studies to the teacher responsible for the course.

The condition for promotion to the second year is completion of 45 hp in the first year.

The condition for starting the Master’s thesis project is 60 hp.

**Recognition of previous academic studies**

See policy of the Royal Institute of Technology

**Studies abroad**

All students study in two different countries during the programme, following the directions for mobility in Erasmus Mundus from the European commission.

**Degree project**

To be awarded a Master’s degree in Security and Mobile Computing the student must, within the course requirements, have fulfilled an independent work (the master’s thesis project) of at least 30hp in Security and Mobile Computing.
The subject for the thesis project may be chosen by the student to be performed at KTH, at other universities, or in industry. A student who has been promoted to the second year may apply to start a thesis project. The thesis is graded on the scale A-F according to the guidelines (criteria: technical content, process and presentation) determined by KTH and by the School of ICT.

See policy of KTH Royal Institute of Technology.

**Degree**

The Master’s degree is obtained after completion of the courses and the thesis with a total of at least 120hp. The degree is ”Teknologiemasterexamen”, translated into English as ”Degree of Master of Science (two years)”. The degree is awarded after application from the student.

See policy of KTH Royal Institute of Technology.

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

Master's Programme, Security and Mobile Computing, 120 credits (TSMKM), Programme syllabus for studies starting in autumn 2015

**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>ID2212</td>
<td>Network Programming with Java</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>II2202</td>
<td>Research Methodology and Scientific Writing</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2206</td>
<td>Internet Security and Privacy</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2215</td>
<td>Advanced Internetworking</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
</tbody>
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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>ID2216</td>
<td>Developing Mobile Applications</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK1501</td>
<td>Communication Systems</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>IK1611</td>
<td>Dimensioning of Communication Systems</td>
<td>7.5</td>
<td>First cycle</td>
</tr>
<tr>
<td>IK2000</td>
<td>Security Architecture for Open Distributed Systems</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2002</td>
<td>Security in Mobile and Wireless Networks</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2200</td>
<td>Communication System Design</td>
<td>15.0</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2213</td>
<td>Network Services and Internet-based Applications</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2214</td>
<td>Telecom Policies and Regulatory Principles</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2217</td>
<td>Advanced Internetworking II</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2220</td>
<td>Software Defined Networking (SDN) and Network Functions Virtualization (NFV)</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2555</td>
<td>Wireless and Mobile Network Architectures</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IO2654</td>
<td>Optical Networking</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ME2062</td>
<td>Technology-based Entrepreneurship</td>
<td>7.5</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</th>
<th>Edu. level</th>
</tr>
</thead>
<tbody>
<tr>
<td>IK2200</td>
<td>Communication System Design</td>
<td>15.0</td>
<td>Second 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>EP2300</td>
<td>Management of Networks and Networked Systems</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>EP2400</td>
<td>Network Algorithms</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>ID2212</td>
<td>Network Programming with Java</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2219</td>
<td>Performance Evaluation for Network Engineering</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2510</td>
<td>Wireless Networks</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2511</td>
<td>Project in Wireless Networks</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2514</td>
<td>Wireless Infrastructure Deployment &amp; Economics</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IK2554</td>
<td>Practical Voice Over IP (VoIP)</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
<tr>
<td>IS2500</td>
<td>RFID Systems</td>
<td>7.5</td>
<td>Second cycle</td>
</tr>
</tbody>
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## Year 3
Appendix 2: Specialisations

Master's Programme, Security and Mobile Computing, 120 credits (TSMKM),
Programme syllabus for studies starting in autumn 2015

This programme has no specialisations.