



Programme syllabus

[An accessible version of the syllabus can be found in the Course and programme directory.](#)

Master's Programme, Communication Systems 120 credits

Masterprogram, kommunikationssystem

Valid for students admitted to the education from autumn 11 (HT - Autumn term; VT - Spring term).

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

Programme objectives

The overall goal of the programme is to graduate qualified students with the ability to apply mathematical and computer-based methods for solving problems in the area of communication systems, with focus on design, implementation, and analysis of communication systems. The programme is designed so that students, when they graduate, can carry out independent work or development work within the area. The student should also have developed a critical reflection attitude for scientific knowledge as well as dependable experience within the area of communication systems. The programme will also give a solid basis for graduate (PhD) education within the area.

Knowledge and understanding

For the degree of Master of Science the student should:

- Show knowledge and understanding within information and communication technology with specialization in communication systems, including broad knowledge of the area as well as the essential in-depth knowledge within certain parts of the area together with in-depth knowledge of the current research and development activities, and
- Show in-depth within information and communication technology.
- Show in-depth knowledge and understanding for the scientific principles within information and communication technology with specialization in communication systems.

Skills and abilities

For the degree of Master of Science the student should:

- Show ability to critically and systematically integrate knowledge and to analyze, estimate and handle complex phenomena, problems and situations even with limited input,
- Show ability to critically, independently and creatively identify and formulate problems, to plan and with adequate methods carry out demanding tasks within given time frames and that way contribute to science development and evaluate that work.
- Show ability to, nationally as well as internationally, clearly account for and discuss his conclusions and the scientific and the arguments behind that in dialogues with different groups, and
- Show such proficiency that is needed to participate in research and development or to independently work in other qualified activity.
- Show ability to follow the technical development in communication systems.
- Show ability to use fundamental knowledge in order to investigate new and interesting ideas.

Ability to make judgements and adopt a standpoint

For the degree of Master of Science the student should:

- Show ability to, with communication systems, assess with respect to relevant scientific, social and ethical aspects also show awareness about ethical aspects on research and development.
- Show insight on the possibilities and limitations of science, his/her role in the society and people responsibility for how it can be used, and
- Show ability to identify his/her needs of further knowledge and to have the responsibility for his /her development.

Extent and content of the programme

The Communication Systems program is a two year master program. It consists of 1.5 year (90 ECTS credits) of course work and half a year (30 ECTS credits) of Master thesis project work. The program starts with a set of compulsory courses (30 ECTS credits), which provide in-depth knowledge in the fundamental areas of Communication Systems. The program continues with a wide range of elective courses, allowing the student to specialize within the programme subject areas. The third semester includes a project-oriented course (compulsory or elective) that gives the student the possibility to work in groups and within research projects that run within the ICT School. The fourth semester is devoted to the Master thesis project work.

The courses in the programme can be grouped into four main subject areas:

- Internetworking
- Wireless Networks
- ICT Entrepreneurship and Product Realization
- Communication Systems Security

Eligibility and selection

A completed Bachelor's degree, equivalent to a Swedish Bachelor's degree (180 ECTS credits), from a university recognized by government or accredited by other recognized organization. A Bachelor's degree in Science or Engineering is required for most programs.

To qualify for the Communication Systems Master program, the student should have a Bachelor of Science degree in Electrical/Electronic Engineering, Computer Science, Computer Engineering, Computer Science, or Information Technology, including at least 60 ECTS credits (hp) courses in computer science, basic data/telecom and internetworking, computer systems (computer architecture and operating systems) and programming, at least 30 ECTS credits course work in mathematics, including calculus, linear algebra and mathematical statistics.

A good knowledge of written and spoken English:

Applicants must provide proof of their proficiency in English. The Royal Institute of Technology (KTH) accepts a

TOEFL paper based test, total of 575, 4.5 writing section

TOEFL internet based test, total of 90, 20 writing section

IELTS score of at least 6.5, no band lower than 5.5 (only academic training accepted)

English proficiency tests are waived for applicants with English as language of instruction (minimum 3 years of full-time higher education studies). The student should provide relevant certificate from his/her university with the application.

For EU citizens from KTH's partner universities, a certificate from the University language department or the relevant Head of department stating the student's good English level is satisfactory. However, knowledge of English may be taken into account in the selection process, i.e. a good TOEFL/IELTS result may be of added value.

For selection please see KTH local regulations for degrees.

Implementation of the education

Structure of the education

The school year for KTH undergraduate education is divided into four periods. The study periods have about 7 weeks each with a minimum of 33 study days. Each study period is followed by an exam period containing two available days and at least five exam days. In addition to the four ordinary exam periods three re-exam periods are provided; in January, after May and directly before the first period of the school year.

The school year includes 40 weeks. Teaching, if necessary, can take place outside the school year.

The first year consists of four compulsory courses and four conditionally elective courses. The second year consists of specialization courses within the respective specializations. The education finishes with the Master thesis project.

Courses

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

The curriculum is implemented as a 120 credits (hp) masters program:

- Compulsory courses: 30 ECTS credits (hp)
- Elective courses, including project courses: 60 ECTS credits (hp)
- Masters thesis work: 30 ECTS credits (hp)
- For details see the course list in the appendix.

Further elective courses from the KTH or other national/international universities may be included.

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

Study Application and Period Registration

Every student should before every period, in May respective November, make a study application (course selection). That application is the basis for estimating the number of students that will follow the course. The study application render possible grade registration and payment of study grant from CSN.

Course Selection

No application is needed for the compulsory courses in year 1 and 2. Course selection takes place in two election periods every school year. Election before the Fall at the latest May 15 and before the Spring at the latest November 15.

Study Authorization (Studieberättigande)

For studies in year two:

At least 40 ECTS points out of year one should have been completed by the August period.

Students that do not accumulate the required number of points by the August period will not be transferred to the next semester, instead they will be re-registered for the same study period as before. An individual study plans needs to be approved before new courses can be taken.

Recognition of previous academic studies

According to the high school regulation (högskoleförordningen) a student, that went through higher education with approved result, has the right to count that for a corresponding education in other University. The same applies to students that went through higher education with approved results in Denmark, Finland, Island or Norway or in any other European country that took part in the convention of the European council of April 11 1997 on the recognition of qualifications concerning higher education in the European Union.

Studies abroad

Conditions for studies abroad should be specified

Degree project

To be awarded a Master's degree in Communication Systems the student must, within the course requirements, have fulfilled an independent work (the master's thesis project) of at least 30 hp in Communication Systems.

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, and has completed at least 60 ECTS credits, 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.

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 "Teknologie masterexamen", translated into English as "Degree of Master of Science (two years)". The degree is awarded after application from the stu

Appendix 1 - Course list

Appendix 2 - Programme syllabus descriptions



Appendix 1: Course list

Master's Programme, Communication Systems (TCOMM)

General courses

Year 1

Mandatory courses (30.0 Credits)

Code	Name	Credits	Edu. level
II2202	Research Methodology and Scientific Writing	7.5 hp	Second cycle
IK2206	Internet Security and Privacy	7.5 hp	Second cycle
IK2215	Advanced Internetworking	7.5 hp	Second cycle
IK2217	Advanced Internetworking II	7.5 hp	Second cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
DD2494	Routing on the Internet and Other Packet Switched Networks	9.0 hp	Second cycle
ID2212	Network Programming with Java	7.5 hp	Second cycle
ID2216	Developing Mobile Applications	7.5 hp	Second cycle
II2300	Product Realization Processes I	7.5 hp	Second cycle
II2302	Sensor Based Systems	7.5 hp	Second cycle
IK1501	Communication Systems	7.5 hp	First cycle
IK1611	Dimensioning of Communication Systems	7.5 hp	First cycle
IK2000	Security Architecture for Open Distributed Systems	7.5 hp	Second cycle
IK2002	Security in Mobile and Wireless Networks	7.5 hp	Second cycle
IK2205	Inter Domain Routing	7.5 hp	Second cycle
IK2213	Network Services and Internet-based Applications	7.5 hp	Second cycle
IK2214	Telecom Policies and Regulatory Principles	7.5 hp	Second cycle
IK2507	Wireless Communication Systems	7.5 hp	Second cycle
IK2508	Wireless Transmission Techniques	7.5 hp	Second cycle
IK2555	Wireless and Mobile Network Architectures	7.5 hp	Second cycle
IO2654	Optical Networking	7.5 hp	Second cycle
IS2500	RFID Systems	7.5 hp	Second cycle
ME2062	Technology-based Entrepreneurship	7.5 hp	Second cycle

Year 2

Mandatory courses (75.0 Credits)

Code	Name	Credits	Edu. level
IK2200	Communication System Design	15.0 hp	Second cycle
IK223X	Degree Project in Communications Systems, Second Cycle	30.0 hp	Second cycle
IK251X	Degree Project in Communications Systems, Second Cycle	30.0 hp	Second cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
EP2300	Management of Networks and Networked Systems	7.5 hp	Second cycle
EP2400	Network Algorithms	7.5 hp	Second cycle
IK2001	Security for Java Environment and Electronic Commerce	7.5 hp	Second cycle
IK2207	Communication System Design	18.0 hp	Second cycle
IK2208	Communication System Design	24.0 hp	Second cycle
IK2209	Communication System Design	30.0 hp	Second cycle
IK2219	Performance Evaluation for Network Engineering <i>Open for all programs. Target Master's programs: TCOMM Communication Systems, TSKKM System-on-Chip Design, TEBSM Embedded Systems, TNSSM Network Services and Systems.</i>	7.5 hp	Second cycle
IK2510	Wireless Networks	7.5 hp	Second cycle
IK2511	Project in Wireless Networks	7.5 hp	Second cycle
IK2514	Wireless Infrastructure Deployment & Economics	7.5 hp	Second cycle
IK2554	Practical Voice Over IP (VoIP)	7.5 hp	Second cycle



Appendix 2: Specialisations

Master's Programme, Communication Systems (TCOMM)

This programme has no specialisations.