



Programme syllabus

Master's Programme, Photonics, 120 credits

Masterprogram, fotonik

120.0 credits

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 program is organized by a consortium of 5 European universities in 3 countries where KTH is one partner in the consortium. The program is for two years divided into four semesters. The students spend the first semester in Belgium, the second semester at KTH, and the third semester in Great Britain. The MSc thesis project is conducted during the fourth semester in any of the three countries. After completing the two years, the students are awarded a joint degree from the universities they attended. The name of the program used by the consortium is European MSc in Photonics, EMSP. The conditions for the education and the requirements for a degree will be determined in a consortium agreement between the rectors of the universities in the consortium.

Knowledge and understanding

For a master's degree in Photonics the student shall:

- show knowledge and understanding in the area of Photonics, 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, and
- show advanced knowledge in Photonics methods

Skills and abilities

For a master's degree in Photonics 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 assess 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, and
- show such skills which are required for participation in research and development work or in other independent work of a qualified nature.

Ability to make judgements and adopt a standpoint

For a master's degree in Photonics 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 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.

Extent and content of the programme

The educational program comprises two years, and a joint master's degrees is awarded after completion of the course requirements of 120hp. The level of the education is "advanced" (second cycle). All students follow the same line of study at KTH during the second semester of the program. The language of education at KTH is English except in courses in the Swedish language.

Eligibility and selection

The basic requirement for admission to a master's program at advanced level is a national university degree at basic level (undergraduate, first cycle) of at least 180hp or an equivalent international degree. The specific prerequisites for admission to the master's program in Photonics are previous courses in wave theory and theoretical electromagnetism at a level corresponding to a "kandidatexamen" in electrical engineering or an equivalent international degree (bachelor of science in electrical engineering).

A good knowledge of English, equivalent to Eng B or 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).

The admission of students in the master's program in Photonics follows an evaluation of merits based mainly on the applicant's knowledge, previous education, the university where the studies have been performed, especially meriting previous subjects, study motivation, and references. The knowledge of the applicant is given preference in this evaluation. Eligible applicants are ranked according to the evaluation and admission is granted according to the number available positions determined for the program. The evaluation of applications is performed by the Program Advisory Group consisting of one member from each of the universities in the consortium.

Implementation of the education

Structure of the education

Structure of the education

The program at KTH consists of one semester comprising about 4,5 months and divided into two study periods. Each study period ends in an examination period. The semester at KTH consists mainly of compulsory courses in optics, fiber-optical communications, and laser engineering. Courses in photonics, optical networking, advanced semiconductor materials, and the Swedish language are conditionally elective. Some of the students can return to KTH for a thesis project during the fourth semester.

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 which can be included in the degree but which can not take the place of compulsory or conditionally elective courses to fulfill the requirements for a degree.

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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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 laboratories, and as final grades in small conditionally elective courses. The other universities in the consortium use different national grading scales. The consortium has agreed to use the relevant grading scheme of the European Credit Transfer System (ECTS) as a means of comparing student performance in the different universities.

Conditions for participation in the programme

Each student who has been admitted to the master's program in Photonics is admitted to the compulsory courses belonging to a program semester after program semester registration. Conditionally elective courses are chosen by the student prior to the second semester of the first year. The choice is limited to the courses stated as conditionally elective in the course list. Students who are semester 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. A student is allowed to start the second year of studies, including the master's thesis project, after promotion to the second year. The condition for promotion to the second year is that the universities where the first year is spent notify the consortium of completion of the first year for each student.

Recognition of previous academic studies

KTHs policy för tillgodoräkande: KTH Regulation

Studies abroad

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

Degree project

To be awarded a master's degree in Photonics the student must, within the course requirements, have fulfilled an independent work (the degree project) of at least 30hp in Photonics. The subject for the degree project may be chosen by the student from offered subjects at the university where the fourth semester will be spent. A thesis at KTH is graded on the scale A-F according to the guidelines determined by KTH and by the School of ICT. A-E are passing grades.

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 student.

[Appendix 1 - Course list](#)

[Appendix 2 - Programme syllabus descriptions](#)



Appendix 1: Course list

Master's Programme, Photonics, 120 credits (TPHOM), Programme syllabus for studies starting in autumn 2011

General courses

Year 1

Mandatory courses (22.5 Credits)

Course code	Course name	Credits	Edu. level
IO2653	Fiber-optical Communication	7.5 hp	Second cycle
IO2659	Laser Engineering	7.5 hp	Second cycle
IO2660	EMMP Summer School	1.5 hp	Second cycle
IO2663	Semiconductor- and Nano-Optics	6.0 hp	Second cycle

Conditionally elective courses

Course code	Course name	Credits	Edu. level
DS1502	Swedish 1, Elementary Level	7.5 hp	First cycle
IH2656	Advanced Semiconductor Materials	7.5 hp	Second cycle
IO2654	Optical Networking	7.5 hp	Second cycle
IO2655	Photonics	7.5 hp	Second cycle

Supplementary information

Ghent Optical materials
Ghent Microphotonics
Ghent Mathematics in Photonics
Ghent Photonics
Ghent Optical measurements systems
Ghent Research methodology

Year 2

Conditionally elective courses

Course code	Course name	Credits	Edu. level
AK1213	Swedish Society, Culture and Industry in Historical Perspective	7.5 hp	First cycle
AK2036	Theory and Methodology of Science with Applications (Natural and Technological Science)	7.5 hp	Second cycle
DS1502	Swedish 1, Elementary Level	7.5 hp	First cycle
IH2653	Simulation of Semiconductor Devices	7.5 hp	Second cycle
IH2656	Advanced Semiconductor Materials	7.5 hp	Second cycle
IM2653	Molecular Electronics	7.5 hp	Second cycle
IO2654	Optical Networking	7.5 hp	Second cycle
IO2657	Photonics Laboratory, Photonics Extended Course	4.5 hp	Second cycle
IT2651	Microwave Engineering	7.5 hp	Second cycle
SK2350	Optical Measurement Techniques	6.0 hp	Second cycle

Supplementary information

The third semester is conducted at St Andrews University. During the fourth semester some of the students can perform their master's thesis project at KTH and then one of the elective courses can be added as an extra course.



Appendix 2: Specialisations

Master's Programme, Photonics, 120 credits (TPHOM), Programme syllabus for studies starting in autumn 2011

This programme has no specialisations.