



Utbildningsplan

Masterprogram, elektrofysik

Master's Programme, Electrophysics, 120 credits

120,0 högskolepoäng

Gäller för antagna till utbildningen fr o m HT09.

Utbildningens mål

The master's programme in Electrophysics focuses on the foundations of electrical engineering: electromagnetic fields and their interaction with matter. Physical principles, mathematical methods, and numerical models make up the core of the programme, providing the tools and skills needed to describe electromagnetic processes and analyse complex systems and problems within the field. Specialised knowledge on relevant applications and systems is offered in the specialization courses, covering areas as antenna theory, propagation and damping of electromagnetic waves in various environments and geometries, plasma theory and applications, magnetohydrodynamics, fusion physics, space physics and technology. Programme graduates will be able to work with development, operation and evaluation of systems requiring good electrical engineering knowledge, or continue with research career in the field. The program sets forward a number of study objectives in terms of knowledge and understanding, skills and judgement.

Kunskap och förståelse

For the master's degree, the student should:

- have thorough knowledge about the scientific foundation and common practice of the electrical engineering
- be able to identify electrophysical problems in various technical systems and natural phenomena, and place them in a larger context
- be able to describe technological processes using mathematical models, and to assess the applicability and limitations of the models.

Färdigheter och förmågor

For the master's degree, the student should:

- critically select and apply analytical and numerical methods to solve problems in electrophysics
- search and follow technical and scientific literature in electromagnetic theory and close fields
- communicate with various target groups in a professional way

- be able to plan, organize and document the work, and work together in a group.

Värderingsförmåga och förhållningssätt

For the master's degree, the student should:

- be able to analyze electrical engineering problems with a holistic view of technological systems, in an independent manner acquire the information and knowledge that is necessary to establish a qualified opinion.
- have an insight into possibilities and limitations of technology, its role in society, and responsibilities for its application.

The programme provides the students with knowledge and skills that are needed to continue education to the PhD level, and are also attractive for the industry. The education can be a basis for continued studies at research level in electromagnetic field theory, plasma physics, space physics and fusion research, in which some of the courses can be included in the PhD course work. The objective is to give students maximum freedom to choose the courses of the programme of most interest to them. As the students may come from different backgrounds, a set of obligatory courses is offered in the first year to provide a solid foundation in the field.

Utbildningens omfattning och innehåll

The programme is on the second level and has a duration of two years, it comprises 120 higher education credits (equivalent to 120 ECTS). The language of instruction throughout the programme is English.

Behörighet och urval

Basic eligibility requirements for second cycle education are given in the admission policy of the Royal Institute of Technology (see KTH-handbook).

Basic admission requirements

Basic eligibility to be accepted to the master's program requires a completed Bachelor's degree, corresponding to a Swedish Bachelor's degree (180 higher education credits), or equivalent academic qualifications with at least 60 ECTS credits of course work in electrical engineering or physics from an internationally recognised university. Students should have in addition, good knowledge in English, oral and written, is required. Applicants must provide proof of their proficiency in English. Specific admission requirements for Electrophysics are:

- at least 30 ECTS credits of course work in mathematics including calculus, vector algebra, differential equations, numerical methods
- courses in basic electromagnetics and mechanics

The specific eligibility requirements can be assessed as not-fulfilled if: 1. the average grade is less than 75% of the highest grade.

2. the degree awarding institution is not considered to meet acceptable quality standards by the authorities of the country in which the institution is located.

3. the degree does not qualify for admission to equivalent Master level in the country where the degree is

awarded. The selection process for Electrophysics is based on a total evaluation of the following criteria: university ranking and grade point average, personal motivation, letters of recommendation, course work and professional experience related to the programme.

Utbildningens genomförande

Utbildningens upplägg

The education is laid out in two academic years. The study year for KTH's undergraduate programme is divided into four periods. The study periods correspond to about seven weeks of studies with at least 33 study days. Every study period is followed by an exam period consisting of two dispensable days and at least five exam days. Partitioning of the academic year is described in the KTH-handbook and student web page.

Kurser

Utbildningen sker i kursform. Kurslistor finns i [bilaga 1](#).

The programme is course-based, and consists of obligatory courses, specialisation courses, elective courses and degree project. List of courses are included in appendix 1.

Betygssystem

För kurser på KTH används en sjugradig målrelaterad betygsskala A-F som slutbetyg för kurser på grundnivå och avancerad nivå. A-E är godkända betyg med A som högsta betyg. Betygen godkänd (P) och underkänd (F) används som slutbetyg då särskilda skäl föreligger.

Courses 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.

Villkor för deltagande i utbildningen

No later than November 15 and May 15 each academic year, respectively, the students are required to make a study registration. In order to be registered for elective courses in Term 3, you must have completed at least 45 ECTS of course work.

Tillgodoräknanden

According to current legislation a student who has some university level education with approved result has the right for this education to be credited for corresponding education at a different university. The Director of undergraduate studies at the School of Electrical Engineering takes decision on recognition of complete courses. More information on recognition of previous education is available in KTH-handbook: www.kth.se/info/kth-handboken/II/13/3.html

Utlandsstudier

Exchange studies for course work abroad is not available. The Degree project (Master's Thesis project) can be performed abroad providing the student has an advisor at KTH and one at the receiving institution and that the work follows the KTH regulations for a Thesis project.

Examensarbete

Degree project corresponds to 30 credit units. In general, the obligatory courses must be completed before the degree project can be started. The degree project is normally carried out individually, and the subject is in normal cases a specialization in the field a student studies for. The programme coordinator can in some cases agree for the degree project to be carried out by two students, in which case individual work by each student should be clearly defined. The degree project is graded on the A-F scale, based on the KTH evaluation criteria: content, process and presentation. More details and conditions applicable to the degree project are found in the KTH-handbook.

Examen

Students who have successfully completed a two-year Master's programme (120 ECTS) will be awarded a "Teknologie masterexamen", translated into English as "Degree of Master of Science (two years)". The programme has following conditions for the degree:

1. a total of 90 credits of completed courses from the course list
2. courses in the obligatory block must have been successfully completed
3. at least three specialisation courses must be included
4. a degree project of 30 higher education credits.

The local degree policy at KTH is described in detail in the KTH-handbook. www.kth.se/info/kth-handboken/II/19/1.html

[Bilaga 1 - Kurslista](#)

[Bilaga 2 - Inriktningsbeskrivningar](#)



Bilaga 1: Kurslista

Masterprogram, elektrofysik (TELFM), Utbildningsplan för kull HT2009

Gemensamma kurser

Årskurs 1

Obligatoriska kurser (21,0 Högskolepoäng)

Kurskod	Kursnamn	Omfattning	Utb. nivå
AK2036	Vetenskapsteori och vetenskaplig metodik med tillämpningar (naturvetenskap)	7,5 hp	Avancerad nivå
EF2200	Plasmafysik	6,0 hp	Avancerad nivå
EI2433	Electrotechnical Modelling	7,5 hp	Avancerad nivå

Valfria kurser

Kurskod	Kursnamn	Omfattning	Utb. nivå
EL1150	Introduktionskurs till Matlab	1,5 hp	Grundnivå
SD1105	Matlab	3,0 hp	Grundnivå

Villkorligt valfria kurser

Kurskod	Kursnamn	Omfattning	Utb. nivå
AH2923	Globala satellitnavigeringssystem (GNSS)	7,5 hp	Avancerad nivå
DN2255	Numerisk behandling av differentialekvationer	7,5 hp	Avancerad nivå
ED2200	Energi och fusionsforskning	6,0 hp	Avancerad nivå
ED2210	Elektromagnetiska vågor i dispersiva media	6,0 hp	Avancerad nivå
EI2400	Tillämpad antennteknik	7,5 hp	Avancerad nivå
EI2430	Högspänningsteknik	7,5 hp	Avancerad nivå
EI2440	Elektroteknisk konstruktion	7,5 hp	Avancerad nivå
EL2520	Reglerteknik, fortsättningskurs	7,5 hp	Avancerad nivå
SH2008	Grundläggande modern fysik	6,0 hp	Avancerad nivå
SI2361	Avancerad mekanik	6,0 hp	Avancerad nivå

Kompletterande information

Minst fyra av föreslagna villkorligt valfria kurser ska väljas.

Årskurs 2

Valfria kurser

Kurskod	Kursnamn	Omfattning	Utb. nivå
ED2250	Publicering av examensarbete inom fusionsplasmafysik	7,5 hp	Avancerad nivå
EF2225	Projekt i rymdfysik	12,0 hp	Avancerad nivå
EF2250	Publicering av examensarbete inom rymd- och plasmafysik	7,5 hp	Avancerad nivå
EF2260	Rymdmiljö och rymdteknik	6,0 hp	Avancerad nivå
EH2720	Projektstyrning	7,5 hp	Avancerad nivå
EI2420	Elektromagnetisk vågutbredning	7,5 hp	Avancerad nivå
EL2620	Olinjär reglering	7,5 hp	Avancerad nivå
EQ1220	Signalteori	7,5 hp	Grundnivå
IT2651	Mikrovågsteknik	7,5 hp	Avancerad nivå
SH2401	Stjärnornas struktur och utveckling	6,0 hp	Avancerad nivå
SH2402	Astrofysik	6,0 hp	Avancerad nivå
SH2771	Rymdfarkosters dynamik	9,0 hp	Avancerad nivå
SK2400	Kvantelektronik inkl elektrooptik	12,0 hp	Avancerad nivå

Villkorligt valfria kurser

Kurskod	Kursnamn	Omfattning	Utb. nivå
DN2274	Elektromagnetiska beräkningar	7,5 hp	Avancerad nivå
ED2220	Experimentell fusionsplasmafysik	6,0 hp	Avancerad nivå
ED2230	Kaos och själv-organisation	6,0 hp	Avancerad nivå
EF2215	Plasmafysik II	7,5 hp	Avancerad nivå
EF2230	Experimentella metoder i rymdplasmafysik	6,0 hp	Avancerad nivå
EF2240	Rymdfysik	6,0 hp	Avancerad nivå
EF2245	Rymdfysik II	7,5 hp	Avancerad nivå
EF2270	Teknisk plasmafysik	6,0 hp	Avancerad nivå
EI2402	Elektromagnetisk förenlighet	7,5 hp	Avancerad nivå
EI2410	Fältteori för vågledare	7,5 hp	Avancerad nivå

Kompletterande information

Minst tre av föreslagna villkorligt valfria kurser ska väljas.



Bilaga 2: Inriktningar

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Programmet har inga inriktningar.