



# Utbildningsplan

Masterprogram, kärnenergiteknik

Master's Programme, Nuclear Energy Engineering, 120 credits

*120,0 högskolepoäng*

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*Gäller för antagna till utbildningen fr o m HT10.*

## Utbildningens mål

The main objective of this programme is to educate skilled engineers for the nuclear industry and the research institutions in Europe and world-wide. The programme is intended for both Swedish students, European students, and students from other parts of the world.

## Kunskap och förståelse

After graduating from the master programme in Nuclear Energy Engineering, the students will:

- have a good ability to apply mathematics and engineering sciences in the general field of nuclear energy and reactor engineering.
- be able to formulate and approach new problem settings in a scientific manner, by having a creative, critical, and systematic attitude towards engineering practice.

## Färdigheter och förmågor

After graduating from the master programme in Nuclear Energy Engineering, the students will be able to:

- work out solution strategies to real engineering problems, knowing the capabilities and limitations of different methods and tools.
- explain and simulate the fundamental physical processes taking place in a nuclear reactor
- make design choices ensuring heat removal, controlability and safety of a power reactor
- select materials suitable for economic and safe operation of a commercial reactor
- work efficiently in a teamwork environment, through experience and by being aware of basic group dynamics.
- work efficiently in an international environment, through experience and by being aware of culture differences.
- communicate results and conclusions in a competent and intelligible manner, both orally and in writing.
- follow and participate in research and development in the field of nuclear energy.

## Värderingsförmåga och förhållningssätt

After graduating from the master programme in Nuclear Energy Engineering, the students will be able to:

- Critically judge a situation and independently acquire the information and knowledge that is necessary to establish a qualified standpoint.

The local degree policy of KTH can be found at:

<http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina/1.27227>

## Utbildningens omfattning och innehåll

The master programme in Nuclear Energy Engineering at KTH is a two-year (120 university credit) educational programme on the advanced level (second cycle). The instruction language is English. The programme consists of a number of compulsory courses, and a selection of elective courses. The courses are scheduled during the first six periods of the programme, with a mix of compulsory and elective courses in each period. With the foundation of the compulsory courses, and with a suitable selection of elective courses, each student will be able to build his/her specialized expertise in a field of interest. The last two periods in the second year of the programme is dedicated to the degree project.

## Behörighet och urval

### *Basic eligibility requirements*

The applicant must hold a completed Bachelor's degree, equivalent to a Swedish Bachelor's degree (180 university credits), from a university recognized by government or accredited by other recognized organisation. A good knowledge of written and spoken English is also required. Applicants must provide proof of their proficiency in English. For details about the basic requirements, see: [http://www.kth.se/eng/education/application\\_admission/masters.html](http://www.kth.se/eng/education/application_admission/masters.html)

### *Specific eligibility requirements*

To be accepted to the master program in Nuclear Energy Engineering, the applicants need to have an academic background in at least one of the following fields; atomic/subatomic physics, mechanical engineering, applied physics, electrical/chemical engineering relevant to power generation/distribution, energy utilisation, material science.

### *Selection process*

The selection process for the master program in Nuclear Energy Engineering is based on a total evaluation of the following selection criteria: university, grade point average (GPA), course work related to the programme, motivation letter, working experiences and references. Complete information on the local admission policy can be found at:

<http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/antagning/1.27186>

## Utbildningens genomförande

### Utbildningens upplägg

The academic year at KTH is divided into four periods. Each period lasts approximately seven weeks, with at least 33 days of study. Each period is followed by an exam period, consisting of two supplementary days and at least five exam days. In addition to the four regular exam periods, there are three additional re-examination periods; after Christmas, after May, and immediately preceding the first study period of the academic year. The academic year lasts for a duration of 40 weeks. Teaching activities may, if necessary, be scheduled outside of the academic year. The master programme in Nuclear Energy Engineering is built around a selection of compulsory courses scheduled the first six periods of the programme. The compulsory courses are intended to give the students a strong foundation in the various science and engineering fields of nuclear energy. In addition, the students are required to select a number of more specialised courses (from the list in appendix I) of elective courses. The last two periods of the second year are dedicated for the degree project.

### Kurser

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

The programme is course-based. Lists of compulsory courses and elective courses are included in appendix 1. The total number of compulsory courses corresponds to approximately 48 university credits. The degree project corresponds to 30 university credits. The remaining credits (to reach the full 120 credits) should consist of the elective courses, as specified in the list of appendix I. If less than five students register for an elective course, the programme director reserves the right to remove the course from that year's curriculum.

Every student is required to make an individual study plan, in agreement with the programme director of the master programme. The study plan should define which courses are selected from the course list. The study plan should be written at the start of the first period, and should then be updated once per term.

In agreement with the programme director of the master programme, a student may replace one or a few courses in the list of elective courses with other courses from the KTH curriculum, if the external course lies within the general field of the master programme.

## **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 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.

## **Villkor för deltagande i utbildningen**

The students are required to make a study registration and course selection, in agreement with the programme director, for the coming term. This should be done no later than November 15, and May 15, respectively, each academic year. In order to be promoted to the second year of the master programme, at least 40 university credits have to be completed during the first academic year, including the re-examination period in August.

## **Tillgodoräknanden**

Under certain circumstances, in accordance to the policy of the Royal Institute of Technology and in agreement with the programme director, credits for previous studies can be received within the frame of the master programme.

## **Examensarbete**

Students admitted to the programme are required to perform an independent study, in the form of a thesis project, corresponding to 30 university credits. The purpose of the degree project is that the student should demonstrate the ability to perform independent project work, using and developing the skills obtained from the courses in the programme. The thesis project can either be performed at a university or at a company/agency that has activities within the general field of the master programme. The student must actively search for a suitable degree project, but KTH will give some assistance with information and contacts. To be allowed to enrol for the degree project, the student must have finished at least 65 university credits within the master programme in total. In addition, all the compulsory courses must be finished. The student must also agree with the programme director that the selected degree project is suitable.

<http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examensarbete/1.27212>

## **Examen**

Students who have completed all the requirements of the master programme, i.e. who have reached the 120 university credits within the framework of the master programme, will be rewarded with the degree named:

*Degree of Master of Science (Two Years)*

After fulfilling the requirements, students must apply for the degree, and at the same time show proof of the basic degree (Bachelor or equivalent degree or higher).

More information is given by the local degree policy of KTH:

<http://intra.kth.se/regelverk/utbildning-forskning/grundutbildning/examina/1.27227>

[Bilaga 1 - Kurslista](#)

[Bilaga 2 - Inriktningsbeskrivningar](#)



# Bilaga 1: Kurslista

Masterprogram, kärnenergiteknik (TNEEM), Utbildningsplan för kull HT2010

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## Gemensamma kurser

### Årskurs 1

#### Obligatoriska kurser (38,0 hp)

Kurskod	Kursnamn	hp	Utb. nivå
MJ2405	Uthållig kraftproduktion	9,0	Avancerad nivå
SH2600	Reaktorfysik, större kurs	9,0	Avancerad nivå
SH2603	Strålskydd, dosimetri och detektorer	6,0	Avancerad nivå
SH2702	Reaktorteknologi	8,0	Avancerad nivå
SH2773	Kärnkraftsäkerhet	6,0	Avancerad nivå

#### Valfria kurser

Kurskod	Kursnamn	hp	Utb. nivå
KD2080	Kärnkemi	7,5	Avancerad nivå
KD2290	Reaktorkemi	6,0	Avancerad nivå
MJ2411	Förnybar energi	6,0	Avancerad nivå
SH2302	Kärnfysik	8,0	Avancerad nivå
SH2604	Fjärde generationens reaktorer	6,0	Avancerad nivå
SH2605	Strålskadefysik i materia	6,0	Avancerad nivå
SH2701	Termohydraulik i kärnkraftsanläggningar	6,0	Avancerad nivå
SH2703	Reaktordynamik och stabilitet	6,0	Avancerad nivå

### Årskurs 2

#### Obligatoriska kurser (13,5 hp)

Kurskod	Kursnamn	hp	Utb. nivå
AK2030	Vetenskapsteori och vetenskaplig metodik (naturvetenskap)	4,5	Avancerad nivå
SH2007	Research Methodology in Physics	3,0	Avancerad nivå
SH2609	Kärnbränslecykeln	6,0	Avancerad nivå

## Valfria kurser

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<b>Kurskod</b>	<b>Kursnamn</b>	<b>hp</b>	<b>Utb. nivå</b>
ED2220	Experimentell fusionsplasmafysik	6,0	Avancerad nivå
EF2200	Plasmafysik	6,0	Avancerad nivå
SH2602	Transmutation av kärnavfall	8,0	Avancerad nivå
SH2606	Kärntekniskt ledarskap	6,0	Avancerad nivå
SH2608	Neutrontransportteori och reaktorkinetik	6,0	Avancerad nivå
SH2772	Chemistry and Physics of Nuclear Fuels	8,0	Avancerad nivå
SH2774	Numeriska metoder inom kärnkraftsteknik	6,0	Avancerad nivå

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# Bilaga 2: Inriktningar

Masterprogram, kärnenergiteknik (TNEEM), Utbildningsplan för kull HT2010

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Programmet har inga inriktningar.