

# Education plan

for

**Master's Programme in Theoretical Physics**  
**Masterprogram i teoretisk fysik**

**120.0 Higher Education**  
**Credits**  
**120.0 ECTS credits**

<b>Programme code:</b>	NTEFO
<b>Valid from:</b>	Autumn 2017
<b>Date of approval:</b>	2006-10-18
<b>Changed:</b>	2017-03-13
<b>Department:</b>	Department of Physics

## Decision

### Prerequisites and special admittance requirements

Degree of Bachelor of Science including more than 90 credits Physics. Also required is knowledge equivalent to Swedish upper secondary course English B or equivalent to one of the following tests; Cambridge CPE and CAE: Pass, IELTS: 6.0 (with no part of the test below 5.0), TOEFL (paper based): 550 (with minimum grade 4 on the written test part), TOEFL (computer based): 213, TOEFL (internet based): 79.

### Programme structure

The compulsory courses during the first year give a thorough knowledge in theoretical physics and the ability to use advanced mathematical and statistical methods. The individually selected courses provide the possibility to specialize within one (or some) of the areas of modern theoretical physics, and give a solid basis for further studies at the Ph.D. level. Examples of specialized areas are condensed matter physics, quantum field theory, string theory, general relativity, cosmology, and statistical physics. The ability to use sophisticated theoretical methods of analysis, and advanced mathematical modeling are attractive skills, both in industry and other sectors of society.

### Goals

In order to obtain a Masters Degree in theoretical physics the student should,

- demonstrate a good knowledge and understanding of theoretical physics, which includes a broad knowledge of general physics and a substantial in-depth knowledge of certain areas of theoretical physics as well as in-depth knowledge of present research and developments.
- demonstrate an in-depth knowledge of methods in theoretical physics.
- demonstrate an ability to critically and systematically integrate knowledge, and to analyze, assess and handle complex phenomena, problems and situations, even when only limited information is available.
- demonstrate an ability to critically, independently and creatively identify and formulate problems; to plan, and use adequate methods to carry out, qualified tasks within given time limit, thereby contributing to the systematic development of knowledge; to critically evaluate her/his work.
- demonstrate an ability, in both a national and an international context, to orally and in writing present and discuss his/her results and the theories, facts and logical arguments that constitute their basis.
- acquire the skills needed to take part in research and development work or to work independently in other qualified areas.
- demonstrate an ability to, within her/his area of expertise, make assessments taking into account scientific, social and ethical aspects and to show awareness of ethical aspects on research and development work.

- demonstrate an awareness of the prospects and limitations of science, its role in society and of the individuals responsibility for its use
- demonstrate an ability to identify her/his need for additional knowledge and to take responsibility for acquiring such knowledge.

### **Courses**

Compulsory courses:

Electrodynamics, AN, 7.5 credits (FK7045)\*

Statistical Physics, AN, 7.5 credits (FK7058)\*

Analytical Mechanics, AN, 7.5 credits (FK7049)\*

Mathematical Methods in Physics, AN, 7.5 credits (FK7048)\*

Programming and Computer Science for Physicists, AN, 7.5 credits (DA7011)\*

Physics Degree Project, AN, 30 credits (FK9001)\*, 45 credits (FK9002)\*, or 60 credits (FK9003)\*

Optional courses:

22.5 – 52.5 credits depending on the extension of the degree project

\*) Courses within the main subject.

### **Degree**

Master degree in theoretical physics

### **Misc**

Students that have been accepted to the program but have not finished their studies within two years can ask permission to finish their studies later.

For the master degree in Theoretical physics it is that the student has completed 120 credits, of which at least 67.5 credits should be advanced theoretical physics courses.

The master degree can include a maximum of 30 credits from non-advanced courses.

Limitations described in individual course plans, as to whether an optional course can be incorporated into the degree apply. Orientation courses cannot be included in the master degree.