

# Syllabus

for course at advanced level

**High Energy Astrophysics**  
**Högenergiastrofysik**

**7.5 Higher Education  
Credits**  
**7.5 ECTS credits**

<b>Course code:</b>	AS7008
<b>Valid from:</b>	Autumn 2019
<b>Date of approval:</b>	2006-09-27
<b>Changed:</b>	2016-01-18
<b>Department</b>	Department of Astronomy
<b>Main field:</b>	Astronomy
<b>Specialisation:</b>	A1F - Second cycle, has second-cycle course/s as entry requirements

## Decision

This syllabus has been approved by the Board of the Faculty of Science at Stockholm University 2008-04-07.

## Prerequisites and special admittance requirements

To enter this course knowledge corresponding to a Bachelor's degree in physics, or similar, is required. In particular, basic knowledge in gasdynamics and radiation processes corresponding to the courses Astrofysikalisk gasdynamik, AN, 7,5hp (AS7002) and Astrofysikaliska strålningsprocesser, AN, 7,5hp. (AS7005) is needed. Also required is knowledge equivalent to Swedish upper secondary school 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.

## Course structure

Examination code	Name	Higher Education Credits
HELA	High Energy Astrophysics	7.5

## Course content

The course covers the following areas: compact objects, mass transfer in binary systems, accretion discs, active galactic nuclei, gamma-radiation bursts, cosmic radiation and acceleration mechanisms for relativistic particles.

## Learning outcomes

It is expected that the student after taking the course will be able to: describe the most important radiation mechanisms and their observable aspects, and the dynamics of different types of compact objects - show understanding for the basic physics of accretion discs - describe different acceleration processes - describe the most common relativistic effects of compact objects.

## Education

The education consists of lectures, exercises, in-depth studies and oral or written reports. Participation at oral presentations is compulsory. An examiner may rule that a student is not obliged to participate in certain compulsory education if there are special grounds for this after consultation with the relevant teacher.

## Forms of examination

a. Examination for the course is in the following manner: measurement of knowledge takes place through:: Written examination, written and/or oral presentation of in-depth studies.

b. Grading is carried out according to a 7-point scale related to learning objectives: A = Excellent B = Very Good C = Good D = Satisfactory E = Sufficient Fx = Fail F = Fail c. Grading criteria for the course will be distributed at the start of the course. d. A minimum grade of E is required to pass the course, together with: participation in all compulsory education. e. Students who fail to achieve a pass grade in an ordinary examination have the right to take at least further four examinations, as long as the course is given. The term "examination" here is used to denote also other compulsory elements of the course. Students who have achieved a pass grade on an examination may not retake this examination in order to attempt to achieve a higher grade. Students who have failed to reach a pass grade on two occasions have the right to request that a different teacher be appointed to set the grade of the course. A request for such appointment must be sent to the departmental board.

### **Interim**

Students may request that the examination is carried out in accordance with this syllabus even after it has ceased to apply. This right is limited, however, to a maximum of three occasions during a two-year-period after the end of giving the course. A request for such examination must be sent to the departmental board.

### **Limitations**

The course may not be included in a degree together with the courses "Högenergiastrofysik, gk, 5p" (AI1310), or the equivalents.

### **Misc**

The course is a component of the Master's programme in Astronomy, but can also be taken as an individual course.

### **Required reading**

Course literature is decided by the departmental board and is described in an appendix to the syllabus.