Department of Astronomy

Stockholm University

Syllabus

for course at advanced level

Astrophysical Gas Dynamics
Astrofysikalisk gasdynamik

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	AS7002
Valid from:	Spring 2008
Date of approval:	2007-03-26
Changed:	2008-04-07
Department	Department of Astronomy
Subject	Physics
Specialisation:	A1N - Second cycle, has only first-cycle course/s as entry requirements

Decision

This syllabus has been approved by the Board of the Faculty of Science at Stockholm University 2006-09-27, and was revised 2007-03-26 and 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. 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	Astrophysical Gas Dynamics	7.5

Course content

The course discusses the gas dynamic processes that are important in astronomy. It covers the basic equations that describe gas motions, both with and without magnetic fields, shocks, turbulence, instabilities, gravity and gas, as well as an introduction to the numerical methods available to solve the gas dynamic equations.

Learning outcomes

It is expected that the student after taking the course will be able to: know the gas dynamic equations and to understand their properties - solve simple problems in gas dynamics like, e.g., stationary solutions and shock solutions - know the basic ideas behind numerical solutions to the gas dynamic equations - know and understand the most important types of instabilities - know the astrophysical applications of gas dynamics like, e.g., accretion discs, stellar winds and explosions.

Education

The education consists of lectures, exercises and practical laboratory work. Participation in the practical laboratory work and group education associated with this 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 or oral examination, hand-in exercises and written reports for the laboratory work.

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.

Misc

The course is a component of the Master's programme in Astronomy, but it 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.