Department of Astronomy

Stockholm University

# Syllabus

for course at advanced level

**Observational Astrophysics I**
**Astronomisk observationsteknik I**

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

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|---|---|
| **Course code:** | AS7003 |
| **Valid from:** | Autumn 2008 |
| **Date of approval:** | 2006-09-27 |
| **Changed:** | 2008-05-19 |
| **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 2008-05-19.

## 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 |
|---|---|---|
| TEN1 | Exam | 7.5 |

## Course content

The course discusses basic theoretical, practical and technical conditions for detection of astronomical signals, in particular electromagnetic (EM) radiation. With the help of diffraction theory a broad base is provided for the understanding of detection processes, regardless of the energy spectrum of the photons. Preparations for observations as well as reductions of data are discussed both theoretically and practically.

## Learning outcomes

It is expected that the student after taking the course will be able to: know and understand the physical processes which give rise to detection of astronomical signals - know and understand the basic theory for the description of detection and imaging av astronomical signals - know and describe different types of astronomical observation systems, including optical systems and detectors - describe sources of noise and the resulting noise in the stochastic detection process, as well as estimate the signal-to-noise ratio and related integration times for a given observation - show ability to independent gathering of knowledge about the physical processes that are discussed, and in an independent way transmit this knowledge to other students and the teacher.

## Education

The education consists of lectures, project work with associated report, practical laboratory work, and hand-in exercises. 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, and written or oral report for hand-in exercises and project 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 at other students seminars and reports. 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 ”Astronomisk observationsteknik gk, 5p” (AI1250), or the equivalents.

**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.