Faculty of Science

ASTM15, Astronomy: Laboratory Astrophysics, 7.5 credits

Astronomi: Laboratorieastrofysik, 7,5 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2007-06-14 (N 2007/149). The syllabus comes into effect 2007-07-01 and is valid from the autumn semester 2007.

General information

The course is an optional course for second-cycle studies for a Degree of Master of Science (120 credits) in astrophysics.

Language of instruction: Swedish and English
If needed, the course is given in English.

Main field of study	*Specialisation*
Physics	A1N, Second cycle, has only first-cycle course/s as entry requirements
Astrophysics	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

On completion of the course, the student shall have acquired the following knowledge and skills. The student shall have

- detailed knowledge of spectra of elements of astro-physical and cosmological interest
- knowledge of atomic processes in stellar atmospheres and other cosmic plasmas
- understanding of how knowledge of atomic spectra are used when analysing spectra from stars
- obtained insight into how the information about stars is obtained from their spectra

- obtained insight in experimental and theoretical methods for determination of atomic parameters.

Course content

The course contains those parts of atomic physics that are necessary in the study of astro-physical spectra, from which one can determine the chemical composition of stars and the interstellar medium and obtain information about different atomic processes in cosmic plasmas. The course also contains the physical foundations of models of stellar atmospheres and other plasmas in space. From the contents:
Atomic structure and spectra of atoms and ions with several valence electrons. Experimental and theoretical determination of different atomic parameters of astro-physical relevance. Radiative transitions. Excitation and de-excitation, ionisation and recombination.
Recording and analysis of the stellar spectra. Effects of observational and physical parameters. Determination of stellar parameters. Construction of a synthetic stellar spectrum based on a stellar atmosphere in thermal equilibrium. Interpretation of various types of spectra and spectral lines.

Course design

The teaching consists of lectures, laboratory sessions and exercises. Participation in laboratory sessions and exercises and thereby integrated other teaching is compulsory.

Assessment

The examination consists of laboratory reports as well as written and oral examination at the end of the course. Students who do not pass the regular exam are offered a new possibility shortly after the regular exam.

Grades

Grading scale includes the grades: Fail, Pass, Pass with distinction
To pass the entire course, a passed examination, approved laboratory reports and participation in all compulsory course elements is required. The final grade is determined by combining the results in the different parts of the examination.

Entry requirements

The prerequisites for admission to the course are English B and knowledge equivalent to FYSA31 Physics 3, modern physics, 30 credits.

Further information

The course cannot be credited towards a degree together with AST219, Laboratory astrophysics 5p.