Department of Astronomy

Stockholm University

Syllabus

for course at advanced level

Galaxy Formation and Evolution
Galaxernas bildning och utveckling

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	AS8001
Valid from:	Autumn 2019
Date of approval:	2019-01-14
Department	Department of Astronomy
Main field:	Astronomy
Specialisation:	A1F - Second cycle, has second-cycle course/s as entry requirements

Decision

This syllabus was approved by the Board of the Faculty of Science at Stockholm University 2019-01-14.

Prerequisites and special admittance requirements

Admission to the course requires knowledge equivalent the courses Cosmology, 7.5 credits (AS5003) and Galaxies, 7.5hp (AS7022). Also required is knowledge equivalent to Swedish upper secondary school course English 6, 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	Galaxy Formation and Evolution	7.5

Course content

This course treats the formation and evolution of galaxies from a cosmological perspective and in this it connects closely to state of art research. Concepts which will be taught include: Growth and collapse av density fluctuations in an expanding Universe; baryonic processes connected to structure and galaxy formation; the intergalactic medium; cosmic reionization and the first galaxies; observations of high redshift galaxies; the chemical, morphological, spectral and luminosity evolution of galaxies; galactic inflows and outflows; hierarchical galaxy evolution; the large scale structure of the Universe and how it developed; galaxy clusters; baryonic oscillations; the development of quasars and the growth of massive black holes.

Learning outcomes

Upon completion of the course, students are expected to be able to:
• describe the theoretical backgrounds of the formation of galaxies and structure in the Universe.
• show good knowledge of properties of galaxies in the early Universe and the evolution of galaxies and the intergalactic medium as a function of time.
• perform basic calculations relevant for galaxy formation and evolution
• read, summarize and discuss modern research literature on galaxy formation and evolution.

Education

Instruction consists of lectures, seminars and exercises. Instruction will take place in English. Participation in seminars and any

associated integrated instruction is compulsory. In the event of special circumstances, the examiner may, after consultation with the teacher concerned, grant a student exemption from the obligation to participate in certain compulsory instruction.

Forms of examination

a. The course is examined as follows: Knowledge assessment takes the form of written exam, written and oral project presentations. Examination may take place in English.

b. Grades will be set according to a seven-point scale related to the learning objectives of the course:
A = Excellent
B= Very good
C = Good
D = Satisfactory
E = Adequate
Fx = Fail, some additional work required
F = Fail, much additional work required

c. The grading criteria will be distributed at the beginning of the course.

d. In order to pass the course, students must receive a passing grade and participate in all mandatory instruction.

e. Students who receive a failing grade on a regular examination are allowed to retake the examination as long as the course is still provided. The number of examination opportunities is not limited. Other mandatory course elements are equated with examinations. A student who has received a passing grade on an examination may not retake the examination to attain a higher grade. A student who has failed the same examination twice is entitled to have another examiner appointed, unless there are special reasons to the contrary. Such requests should be made to the department board.
The course includes at least two examination opportunities per year when the course is given. At least one examination opportunity will be offered during a year when the course is not given.

f. Students awarded the grade Fx are given the opportunity to improve their grade to E. The examiner decides the supplementary assignments to be performed and the pass mark criteria. The supplementary assignments will take place before the next examination session.

Interim

Students may request that the examination be conducted in accordance with this course plan even after it has ceased to be valid. However, this may not take place more than three times over a two year period after course instruction has ended. Requests must be made to the departmental board. The provision also applies in the case of revisions to the course plan (and the revisions of the course literature).

Misc

The course can be part of the master programme in astronomy but can also be read as a separate course.

Required reading

The course literature is decided by the department board and published on the department of astronomy's website at least two months before the start of the course.