EF2240 Space Physics 6.0 credits

Rymdfysik

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for EF2240 valid from Spring 2019

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Electrical Engineering,Engineering Physics,Physics

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The goals of the course are that the student should be able to:

- define what is meant by a plasma, and how different types of plasmas can be classified.
- describe the plasma environment in space, with focus on the near-earth environment.
- explain how certain important plasma populations in the solar system, e.g. the Earth's ionosphere and magnetosphere, get their basic properties, and how these properties may differ between the planets.
- make order of magnitude estimates of some properties in space plasmas and space phenomena, e.g. the power dissipated in the aurora, or the amount of current floating from Earth's magnetosphere to its ionosphere.
- model certain space physics phenomena by applying basic physical laws, using simple mathemathics (e.g. model the form of the magnetosphere or estimate the temperature of a sunspot).
- describe current research within space physics and explain it to an interested layman.

Course contents

The plasma state. Typical properties of space plasmas. The sun and the solar wind, and how they effect the Earth’s space environment. The magnetosphere and the ionosphere, their origin, structure and dynamics. The aurora and geomagnetic storms and substorms. Space weather. Space environment of other celestial bodies. Interstellar and intergalactic plasma and cosmic radiation. Current research topics within space physics.

Specific prerequisites

For single course students: 60 hp and documented proficiency in english B, english 6 or equivalent.

Course literature

C-G. Fälthammar, ”Space Physics” (compendium), 2nd Ed, Third Printing, 2001, Larry Lyons, ”Space Plasma Physics”, from Encyclopaedia of Physical Science and Technology, 3rd edition, 2002.

Examination

- TEN1 - Examination, 6.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH’s coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

Written examination. During the course, also continual examination will take place; some activities will provide bonus points which will be added to the written examination.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.