Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Syllabus

BI0987.2 Energy systems from a biogeoscience perspective, 10.0 credits

Energisystem i biogeovetenskapligt perspektiv

The course is given Master Programme in Energy Systems Engineering

Version 2 in Slukurs. Corresponds to version 6, 7 and 8 in Ladok

Syllabus approved

3 October 2013

The version applies to students admitted from autumn 2014

The version is not a module version

Subjects

Biology/Soil science

Education cycle

First cycle

Modules

Title	Code	Credits
Single module	0201	10.0

Advanced study in the main field

First cycle, has only upper-secondary level entry requirements (G1N)

Grading scale

5:Pass with Distinction, 4:Pass with Credit, 3:Pass, U:Fail
The requirements for attaining different grades are described in the course assessment criteria which are contained in a supplement to the course syllabus. Current information on assessment criteria shall be made available at the start of the course.

Language

Swedish

Prior knowledge

Knowledge corresponding to general entrance requirements for studies at a Swedish college or university and Mathematics E, Physics B and Chemistry A.

Objectives

The aim of the course is to give the basic geological, meteorological, hydrological and biological prerequisites for the different energy systems.

After the course the student should
- be able to summarize the prerequisites for the primary energy sources – the solar energy and the geothermal energy – and how these in different forms drive the biotic and abiotic energy systems
- orally and in written form account for how different basic geological, meteorological, hydrological and biological conditions, and processes affects the prerequisites for how different energy sources can be used.

Content

The course describes how geological, meteorological, hydrological and biological processes affects and drives the energy systems.

The geology part gives a background on how geoenergy, nuclear energy, and carbon capture and storage (CCS) can be used. Within the meteorology part, solar radiation and wind are discussed as energy sources for solar cells, solar collectors, wind- and wave power, and as power for photosynthesis. The variation in climate, in relation to the geographical conditions, is described and how it affects the energy outcome. The hydrology describes the water cycle in the nature, especially the flow of ground and surface water and its importance for water power, and the effect of water supply for biomass production.

The biology part gives basic knowledge about the cell organization and function as system for biochemical energy transformation (respiration, fermentation, photosynthesis). Microbial conversion of biomass is exemplified with production of hydrogen, ethanol and biogas. The use of solar energy is considered with focus on the direct energy bound through photosynthesis in biomass and from production

physiology and ecological point of view. The regional and environmental conditions for plant production are discussed.

Biological and geological processes, that have led to storage of bound solar energy in form of coal, oil and peat are considered. The biogeoscientific prerequisites for the different energy systems are also discussed in project works, in groups, that are reported both orally and in written form.

Implementation

Scheduled activities

Lectures

approx. 60 Hours

Laboratory work

approx. 15 Hours

Compulsory

Exercises

approx. 20 Hours

Compulsory

Supervision and presentation of project work

approx. 5 Hours

Compulsory

Study visit

approx. 5 Hours

Compulsory

Examination and evaluation

approx. 5 Hours

Excursions

approx. 10 Hours

Compulsory

Group activities, not scheduled

Group assignments

approx. 30 Hours

Individual studies, not scheduled

Literature studies

approx. 110 Hours

Individual tasks

approx. 10 Hours

Total

approx. 270 Hours

Formats and requirements for examination

Written and oral presentation of group projects. Written examination.
Passed reports and examination. Participation in compulsory course components.

- If the student fails a test, the examiner may give the student a supplementary assignment, provided this is possible and there is reason to do so.
- If the student has been granted special educational support because of a disability, the examiner has the right to offer the student an adapted test, or provide an alternative assessment.
- If changes are made to this course syllabus, or if the course is closed, SLU shall decide on transitional rules for examination of students admitted under this syllabus but who have not yet passed the course.
- For the examination of a degree project (independent project), the examiner may also allow the student to add supplemental information after the deadline. For more information on this, please refer to the regulations for education at Bachelor's and Master's level.

Additional information

- The right to take part in teaching and/or supervision only applies to the course date to which the student has been admitted and registered on.
- If there are special reasons, the student may take part in course components that require compulsory attendance at a later date. For more information on this, please refer to the regulations for education at Bachelor's and Master's level.

Responsible department

Department of Soil and Environment
Cooperating departments:
Department of Ecology
Department of Crop Production Ecology

Supplementary Information

Finalized by: Utbildningsutskottet för ekonomi, miljö och teknik
Biology Area: Ecology