Faculty of Science

NGEN16, Physical Geography: Biosphere-Atmosphere Interactions, 15 credits

Naturgeografi: Samspel mellan biosfär och atmosfär, 15 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2018-04-20 to be valid from 2018-04-20, autumn semester 2018.

General Information

The course is an elective course at second cycle level for Degree of Master of Science (120 credits) in main field of study physical geography and ecosystem sciences or atmosphere science and biogeochemical cycles as well as an optional course for a Degree of Master of Science (120 credits) in the main field of study geomatik.

Language of instruction: English

Main field of studies	*Depth of study relative to the degree requirements*
Physical Geography	A1N, Second cycle, has only first-cycle course/s as entry requirements
Physical Geography and Ecosystem Analysis	A1N, Second cycle, has only first-cycle course/s as entry requirements
Atmospheric Sciences and Biogeochemical Cycles	A1N, Second cycle, has only first-cycle course/s as entry requirements
Physical Geography and Ecosystem Science	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is to supply knowledge of the processes that control states and flows of mass and energy between soil and vegetation and atmosphere. The emphasis lies on the physical processes that control energy and carbon exchange as well as transport of water between soil and atmosphere. Furthermore, the course intends to communicate knowledge of different measuring techniques. The course also

communicates knowledge of processes at micro meteorologic level that is needed for an understanding of the role of the ecosystems in the landscape. This knowledge is an essential precondition for the development of sustainable use and management of terrestrial ecosystems.

Knowledge and understanding

On completion of the course, the students shall be able to:

- explain energy exchange and radiation exchange at the earth surface
- account for transport of water from the soil to the atmosphere via the vegetation
- account for wind and turbulent transport in an interface in the atmosphere
- describe temperature conditions and heat flow in the soil
- describe processes within ground and soil water hydrology
- explain principles of how different relevant measuring instruments function

Competence and skills

On completion of the course, the students shall be able to:

- Collect, organise and evaluate data in an integrated way
- use distributed simulation models to analyse regional water balance
- use different measuring techniques to estimate energy exchange and water circulation between soil, water and vegetation.
- analyse and present results for both the collected and modelled data in oral and written form

Judgement and approach

On completion of the course, the students shall be able to:

- discuss and evaluate methods and interpretations of measurements of energy and gas exchange critically
- relate to difficulties in connection with estimates of water and gas exchange at different levels

Course content

The course gives a broad and advanced theoretical background of the most important energy exchange processes in the interface between the atmosphere and vegetation and soil. Theory of processes such as turbulent transport and processes that control the energy balance and exchange of gases will be described. Important components in the course is a field data collection campaign to develop skills in measuring techniques, data analysis, application of theoretical knowledge on measurements of energy exchange and water balance and gas exchange. To analyse interplay of different processes in ecosystems, a distrubuerad simulation model is used for energy exchange, water balance and biological processes.

Course design

The teaching consists of lectures, exercises, group assignments and project work. The course includes a field data collection campaign that is compulsory. In those cases where a student has valid reason to not participate in field work, an alternative assignment of equivalent extent is offered. Participation in exercises, group and project work as well as associated components are compulsory.

Assessment

The examination consists of a skrifligt examination and graded oral and written exercise and project reports during the course. For students who have failed the regular examination, an additional occasion in close connection to this is offered.

In consultation with Disability Support Services, the exam may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equal to that of a student without a disability.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.
For a Pass on the course as a whole, students must have passed the exam, the written assignments and project presentations, and participated in all compulsory components.

Entry requirements

For admission to the course, 90 credits been required scientific studies including NGEA04 Ecosystem analysis, 15 credits, or the equivalent, as well as NGEA07 physical geography theory and methodology, 15 credits, or the equivalent.

Further information

The course may not be included in qualification together with NGEN10 Ekosystemhydrologi 15 credits

Subcourses in NGEN16, Physical Geography: Biosphere-Atmosphere Interactions

Applies from H18

1802 Energy balance exercise, 1,5 hp
Grading scale: Fail, Pass
1803 field work, 3,0 hp
Grading scale: Fail, Pass
1804 Report on field work, 3,0 hp
Grading scale: Fail, Pass, Pass with distinction
1805 Report on modelling exercise, 3,0 hp
Grading scale: Fail, Pass, Pass with distinction
1806 Written exam, 4,5 hp
Grading scale: Fail, Pass, Pass with distinction