LUND UNIVERSITY
Faculty of Science

Syllabus for the course Global change in the Arctic – practical effects and their evaluation, NNG002F

Swedish title: Global förändring i Arktis - Praktiska effekter och utvärdering

The course syllabus was confirmed by the Faculty board for graduate studies 4 June 2019. The course is in the third cycle and amounts to 7.5 credits.
The course syllabus is formally approved in Swedish. This is a translation.

Learning outcomes
On completion of the course, participants shall be able to:

Knowledge and understanding
- Demonstrate deeper understanding of the many-fold processes leading to changes in the Arctic.
- Predict changes in the future caused by these processes.

Skills and abilities
- Design experiments and measurement campaigns in quantifying changes in the Arctic.
- Analyze data from own measurements as well from remote sensing and previous measurements to quantify changes in the Arctic.
- Use current state of the art methods to collect data like for example drones.

Judgement and approach
- Explain why the changes both from a climate as well as from a socioeconomic point of view happen as they happen.
- Compare different sites with different exposures and predict trajectories.
- Summarize the results and generate suggestions for politicians about management decisions (like tourism channeling).

Course content
Introduction into the Arctic region and Svalbard. The students will prepare projects to be conducted on site. Introduction to the necessary techniques and equipment, e.g. application of drones.
During field work at Svalbard, the course leaders will demonstrate the effects of global change in a high Artic permafrost environment and how they are evaluated during a number of excursions from Longyearbyen and from the Isfjord radio station.

Glacial retreat:
- At Trygghamna we will show arctic primary succession on land areas which have been cleared for different durations since the local glacial retreat starting in 1936.

Vulnerability of the landscape:
In a number of day-long excursions it will be demonstrated how both climate change but also tourism has changed the landscape. This will include:

- changes in biodiversity (expansions of species ranges),
- changes in soil formation (depressions due to tractor use),
- changes in erosion rates (due to longer time of de-frozen soil),
- changes in hydrological properties of the landscape
- changes in the active layer depth

Cultural changes:

- Due to the replacement of the mining-based economy to a tourism-based economy

Within a small-scale project the participants will record effects of global change in the Arctic and evaluate them in small groups (2-3). Here we offer a wide range of opportunities:

- Evaluating effects of tractor use by evaluating highly resolved 3d models taken in the area using a drone.
- Evaluating effects on biodiversity
- Evaluating effects on cultural changes using interviews
- Evaluating effects on erosion rates
- Evaluating effects on hydrography
- Weathering of limestone
- Evaluating evidence of tourism impact

Beside this range of projects, we are open to other practically feasible small-scale projects that meet the course objectives. The projects have to be approved and developed in Lund to assure their feasibility in the field.

After the trip, the students will continue working on their recorded data and will present their work in an open seminar at the department.

Teaching
The course will be based on lectures before the excursion and explanations by the leaders during the excursion. The students will present their project work after the excursion. Field guides are available for all excursions.

Assessment
The assessment is based on attendance and on the presentation of the project. Participation in the field work is mandatory.

Grading scale
Possible grades are Pass and Fail. For a grade of Pass the student must participate in the field work at Svalbard and pass the project work presentation.

Language of instruction
English.

Entry requirements
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Additional information

This course will be suitable for a wide range of PhD students from natural sciences as well as from social sciences, since we are covering many aspects of Global change in the Arctic. The PhD project of the participant should be linked to some aspects of Global changes in the Arctic.