

## Seminar / course for Ph.D. students at KTH on Sustainability Issues in Geodesy

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Purpose with the seminar is to contribute to the sustainability goals set for the research education in Geodesy at KTH.

Specifically this is (text from "*Handlingsprogram för programutveckling inom hållbar utveckling för Skolan för arkitektur och samhällsbyggnad och utbildningsprogram Geodesi och geoinformatik*"):

- "All doctoral students shall be made aware of how geodesy and/or geoinformatics can contribute to environmental-, technical-, social-, or economical sustainability
- All doctoral students in Geodesy shall demonstrate knowledge of the UN resolution "A Global Geodetic Reference Frame for Sustainable Development"
- All doctoral students in Geodesy shall demonstrate knowledge of the geodetic contributions to monitoring of the effects of climate change"

Background (text from the same document):

"Geodesy forms the basis for much sustainable development for instance by the definition of geodetic reference frames and height systems, development of digital terrain models, and 3D models of urban and rural areas. Geodata quality is another aspect of geodesy with importance for especially environmental-, technical-, and economical sustainability. Further, for many years geodesy, geodetic models and algorithms as well as geodetic observation methods, have been vital for the monitoring of climate change such as for instance sea level change, glacier retrieval, detection of changes in ground water level and in humidity in the lower atmosphere.

Within the research education, direction Geodesy, these topics are treated in several courses, and many doctoral students have worked with aspects of sustainable development and effects of climate change in their research projects. Also the course on Theory and Methodology of Science which is mandatory for the doctoral students includes aspects of sustainability.

In terms of potential for improvement, aspects of sustainability which are already included in several of the courses should be better highlighted in the course descriptions. Also the sustainability aspects of research projects carried out by the doctoral students can be made clearer in future theses."

## Suggested outline of the course

The course is composed of two meetings (seminars) where the Ph.D. students in Geodesy participate. Between the two seminars, the students will do homework as outlined below.

### Evaluation

The course is passed by the students when the following conditions are met:

- The student participates in both seminars (dates upon agreement)
- The student participates actively in the discussions at the seminars
- The student makes a 20 minute presentation at the second seminar as outlined below

### First seminar

A date is found where all students in geodesy can participate.

Anna Jensen (or another teacher) gives a lecture on the following topics:

- UN sustainable development goals
- UN resolution: "A Global Geodetic Reference Frame for Sustainable Development"
- UN Intergovernmental Panel on Climate Change (IPCC)
- Historical outline and examples of contributions from geodesy to the monitoring of effects of climate change
- Introduction to ethical aspects in geodesy (surveillance and monitoring, codes of conduct etc.)

The lecture will provide an introduction to the topics mentioned and will also raise some questions relevant for geodetic research.

After the lecture, the teacher motivates a discussion with the students on some of the questions raised during the lecture. The discussion is expected to last for at least for an hour and all students must participate.

### Homework

After the first seminar, the Ph.D. students must consider the aspects of sustainability and ethics in relation to their own Ph.D. studies. The Ph.D. students shall find relevant publications and write a short text (e.g. one page) which can be included as part of the introduction in the Ph.D. theses. Also they must prepare a presentation for the second seminar.

### Second seminar

During the second seminar, the Ph.D. students provide a 20 minute presentation each. The first 10 minutes must be used for introducing their research topic to the other students, and the last 10 minutes must be used for presenting considerations on how their research contributes to a sustainable development as well as ethical aspects in relation to their work.

Following each presentation, there will be a short discussion where the other students ask questions and provide feedback to the presenter.

### Homework

After the second seminar, the Ph.D. students shall revise their text (as written above) if this is considered relevant, given the discussions at the second seminar. The text is meant to be included in the Ph.D. thesis and will therefore not be evaluated as part of the course.