T-845-UMHV **SUSTAINABLE ENGINEERING AND THE ENVIRONMENT** **8 ECTS**

Year of study: 4th year (1st year MSc).
Semester: Spring.
Level of course: 5. Second cycle, introductory.
Type of course: Elective.
Prerequisites: None.
Schedule: Runs for 12 weeks – 6 teaching hours a week (optional: one or two day field excursion, e.g. Sólheimar ecovillage).
Supervisor: David Christian Finger.
Lecturer: David Christian Finger.

Learning outcome: Understand major environmental concerns, environmental impact assessments and mitigation techniques.

Content: The purpose of this course is to get an overview of growing environmental problems and to understand and discuss the integration of sciences and engineering principles to improve the natural environment. In particular the conservation of healthy water, air, and land resources for human habitation and for other organisms will be discussed. In this context an overview of environmental impact assessment and mitigation strategies will be given. Topics include airborne pollution; groundwater; hazardous waste disposal; ecological disruption; climate change; environmental footprint and economic disruption.
Basic scientific principles, such as transport processes, mass balance, reaction rates, toxicity and biodiversity will be discussed in context with examples drawn from the various industry sectors. These can include topics such as reinjection of geothermal brine and sequestration of non-condensable gases; habitat disruption from hydropower plants; nuclear waste disposal; oil spills; and carbon capture and storage.
Upon completion of this course students will be familiar with the most common forms of anthropogenic environmental impact, estimation of their severity and understand possible mitigation techniques.

Reading material: To be announced.
Teaching and learning activities: Student presentations, discussion sessions, group work, projects and guest lectures. Students will work on a semester project dealing with a contemporary topic from the industry (e.g. power plant, incineration plant, sport event). The project should focus on mitigating environmental impacts. Within the project students will incorporate acquired skills while demonstrating how environmental impacts can be minimized. Students will present final projects to an interested audience.

Assessment methods: The written report will be graded and the final presentation will be graded. Grading will focus primarily on the correct application of techniques learned during class.

Language of instruction: English.