Department of Physical Geography

Stockholm University

Syllabus

for course at advanced level

Applied Environmental Modelling II
Tillämpad modellering för miljöanalys II

15.0 Higher Education Credits
15.0 ECTS credits

Course code:	GE8020
Valid from:	Autumn 2012
Date of approval:	2012-05-21
Department	Department of Physical Geography
Main field:	Physical Geography and Quaternary Geology
Specialisation:	A1F - Second cycle, has second-cycle course/s as entry requirements

Decision

Prerequisites and special admittance requirements

Competence equivalent to Applied Environmental Modelling 15 ECTS credits (GE7022) is required. Also required is knowledge equivalent to Swedish upper secondary school course English B.

Course structure

Examination code	Name	Higher Education Credits
MOM1	System Dynamics Methods for Environmental Analysis	7.5
MOM2	Project Based Environmental Modelling	7.5

Course content

Long-term solutions to environmental problems require a systems perspective in order to describe and analyse the dynamic interactions between the various actors involved. This course provides greater understanding of problem-solving strategies utilising systems thinking, and conceptual- and quantitative modelling. The course builds on the student's existing system-theoretical knowledge as well as offering new tools för the application of systems thinking within the realm of environmental analysis and planning.
The course is comprised of the following components:
1. System Dynamics Methods for Environmental Analysis and Planning, 7,5 HECs
This course component includes theory for conceptual- and system dynamic modelling med focus on natural resource management, anthropogenic environmental impact and system sustainability. The component provides knowledge concerning model-based decision-making, non-linear relationships, modelling of human behaviour, as well as introducing the student to several system dynamics modelling tools.
2. Project-based Environmental Modelling, 7,5 HECs.
Analysis of system behaviour within the framework of an individual project-based modelling assignment yields in-depth understanding regarding system structures and their influence over system function, outcomes, and development. Methods for advanced scenario-building, validation and model-testing, and modelling-specific communication will be applied within the project. Projects may be advantageously combined with student's wider educational goals, including thesis work.

Learning outcomes

After taking the course it is expected that the student will be able to:

•identify, represent and analyse complex environmental systems/ dynamic structures
•apply systems-theoretical methods in order to conduct diagnostic and prognostic analyses of complex environmental problems, including identification of bi-flows, path dependence, processes, delays, and multiple non-linear behaviours
•apply hierarchical conceptual modelling (CLD and Stock and Flow)
•identify applicable model designs for natural resource analysis
•explain and apply correct scenario methods, analysing initial states of the system against results
•choose and apply relevant validation methods
•conduct independent environmental modelling assignments
•critically evaluate models and their limitations

Education

Forms of examination

Required reading