

Syllabus

for course at advanced level

Large Scale Challenges to the Climate and the Environment
Storskaliga utmaningar för klimat och miljö

**15.0 Higher Education
Credits**
15.0 ECTS credits

Course code:	MI7014
Valid from:	Autumn 2019
Date of approval:	2018-08-20
Department	Department of Environmental Science and Analytical Chemistry
Main field:	Environmental Science
Specialisation:	A1N - Second cycle, has only first-cycle course/s as entry requirements

Decision

Prerequisites and special admittance requirements

Admission to the course requires knowledge equivalent to a Bachelor's degree in Natural Science or engineering, including 15 credits in mathematics or statistics. Proficiency in English is also required, corresponding to passing English in the Swedish upper secondary school course English B / English 6 (or equivalent).

Course structure

Examination code	Name	Higher Education Credits
DEL1	Global Challenges	3.5
DEL2	Environmentals System	8
DEL3	Statistiska metoder	3.5

Course content

This course provides the environmental science perspective on climate change. The course focus is the human-induced (anthropogenic) perturbations of the Earth system, the biogeosphere, the atmosphere and climate.

The course will provide knowledge about:

- * The functioning of the natural climate and the biogeosphere-atmosphere system: the water cycle, carbon cycle, energy balance, ocean and atmosphere general circulation
- * Mechanisms and concepts: emissions of greenhouse gases and aerosols, climate forcing, earth system and climate feedback, climate sensitivity
- * Natural variations in the climate: How has climate varied during pre-industrial human history?
- * Anthropogenic climate change: What are the evidences? How is it observed? What are causing it? And how is it varying over space and time?
- * Climate change over coming decades-centuries-millennia: What are different scenarios for future emissions and atmospheric concentrations? What effects can we expect on large-scale biogeosphere-atmosphere cycles, ecosystem services, and human societies?
- * Climate change mitigation and adaptation: The UN climate agreements and other initiatives

Learning outcomes

Upon completion of the course, students are expected to be able to:

- * Explain the Environmental System and the most important perturbations (Part 1 and Part 2)
- * Identify and analyse the and its perturbations, including mechanisms and effects (Part 2)
- * Reflect on society's opportunities to remedy the perturbations on the environmental system (Part 2)
- * Apply statistical methods to evaluate environmental data (Part 3)

Education

Instruction consists of lectures, group instruction, exercises, project work, field trips. Participation in project work, field trips, and exercises and any associated integrated instruction is compulsory. In the event of special circumstances, the examiner may, after consultation with the teacher concerned, grant a student exemption from the obligation to participate in certain compulsory instruction.

Forms of examination

a. The course is examined as follows: Knowledge of Part 1 Globala utmaningar (Global Challenges) 3,5 HEC is assessed by written assignments, Part 2 Miljösystemet (The Environmental System) 8 HEC is assessed by written assignments and written exam, and Part 3 Statistiska metoder (Statistical methods) 3,5 HEC is assessed by written reports.

b. Grades will be set according to a seven-point scale related to the learning objectives of the course:

A = Excellent

B = Very good

C = Good

D = Satisfactory

E = Adequate

Fx = Fail, some additional work required

F = Fail, much additional work required

The course units Part 1 and Part 3 will be graded according to a two-point scale: Pass (G) or Fail (U).

c. The grading criteria will be distributed at the beginning of the course.

d. In order to pass the course, students must receive a passing grade on all course units and participate in all mandatory instruction.

e. Students who receive a failing grade on a regular examination are allowed to retake the examination as long as the course is still provided. The number of examination opportunities is not limited. Other mandatory course elements are equated with examinations. A student who has received a passing grade on an examination may not retake the examination to attain a higher grade. A student who has failed the same examination twice is entitled to have another examiner appointed, unless there are special reasons to the contrary. Such requests should be made to the department board. The course includes at least two examination opportunities for each course unit per year when the course is given. At least one examination opportunity will be offered during a year when the course is not given.

f. Students awarded the grade Fx are given the opportunity to improve their grade to E. The examiner decides the supplementary assignments to be performed and the pass mark criteria. The supplementary assignments will take place before the next examination session.

Interim

Students may request that the examination be conducted in accordance with this course plan even after it has ceased to be valid. However, this may not take place more than three times over a two year period after course instruction has ended. Requests must be made to the departmental board. The provision also applies in the case of revisions to the course plan (and the revisions of the course literature).

Misc

The course is part of the Master programmes in Environmental Science but can also be read as a separate course.

Required reading

The course literature is decided by the department board and published on the Department of Environmental Science and Analytical Chemistry's website at least two months before the start of the course.