



## DEPARTMENT OF BIOLOGICAL AND ENVIRONMENTAL SCIENCES

### **ES2613 Global change - problem, analysis, measures, 7.5 higher education credits**

Globala förändringar - problem, analys, åtgärder, 7,5 högskolepoäng

*Second Cycle*

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#### **Confirmation**

This course syllabus was confirmed by Faculty of Science on 2011-10-27 and was last revised on 2015-05-22 by Department of Biological and Environmental Sciences to be valid from 2015-05-22, autumn semester of 2015.

*Field of education:* Science 100%

*Department:* Department of Biological and Environmental Sciences

#### **Position in the educational system**

The course is the first course in the master programme Environmental Science at the Faculty of Science, University of Gothenburg, but the course could also be chosen as a freestanding course. The course is recommended for students with a Bachelor of Science, including at least 15 hec in environmental science.

The course is at Second cycle level in Environmental science

#### *Main field of studies*

Environmental Science

#### *Specialization*

A1N, Second cycle, has only first-cycle course/s as entry requirements

#### **Entry requirements**

Admission to the course requires one of the following options:

1) 120 HEC out of which at least 90 HEC are in natural science (biology, chemistry, earth science, environmental science-natural science, physics) or technology, and at least 15 HEC in environmental science-natural science. Students with equivalent education can be allowed to enter the course.

2) Bachelor's degree in biology

All participants must prove their knowledge of English: English 6/ English B from Swedish Upper Secondary School or the equivalent level of an internationally recognized tests, for example TOEFL, IELTS.

Selection is based upon the number of credit points from previous university studies, maximum 225 HEC.

### **Learning outcomes**

The course provides knowledge about how society tackles major global environmental problems, such as global warming, ozone depletion and transboundary air pollutants. A special focus is on the design and implementation of international agreements, based on both natural science and social science (in particular law) perspectives. Furthermore, the course also includes policy making at EU, national, regional and local level.

#### *5.1 Knowledge and understanding*

To pass the course the participants should have a far reaching understanding of:

the principles ruling international environmental agreements

the projected impacts of climate change on ecosystems and ecosystem services

the Climate convention, The Kyoto protocol, emissions of greenhouse gases and trade with emission allowances for greenhouse gases

the Vienna Convention to Protect the Ozone Layer, The Montreal Protocol and the factors that made this agreement successful

the Convention on Long-Range Transboundary Air Pollution (LRTAP) and its protocols and the scientific tools and the computer simulation methods on which the work of the convention is based, and the work within EU in relation to LRTAP

EU legislation with emphasis on the role of EU as a part to international conventions

EU, Swedish, regional and local policy making in the field of climate change

how policies in the climate change area are implemented and what measures that are the actual outcome, all the way down to the company, the public body and the citizen.

Proposed but not yet implemented measures are also included

#### *5.2 Skills and abilities*

After completed course, the participants should have shown ability to summarise, analyse and orally present scientific material, perform a computer simulation projecting climate change impacts, formulate questions and find answers concerning international environmental collaboration.

### 5.3 Judgement and approach

After completion of the course the student should be able to critically evaluate the positions of different actors active in and around international environmental agreements, in particular the use of scientific data and results as drivers for these regimes. The student should also be able to have an opinion on what obstacles there are in negotiating a follow up agreement to the Kyoto protocol, and also be able to discuss the relation between a signed international agreement and the following EU and national policy making process.

The course is sustainability-related, which means that at least one of the learning outcomes clearly shows that the course content meets at least one of the University of Gothenburg's confirmed sustainability criteria.

#### **Course content**

The overall objective of the course is to study climate change, stratospheric ozone depletion and transboundary air pollutant issues, and in particular how society initiates solutions based on a scientific understanding of the problems. The course includes an introduction to the scientific background to these problems as well as studies of how the international society develops international agreements in the field. An important aspect is how scientific methods and discoveries are implemented in the agreements. A third part of the course is devoted to how those agreements are translated into national policies and in the end to practical measures from actors in society.

The course consists of three subparts:

- 1) Compulsory elements, in the form of e.g. computer exercise, seminars and other similar moments marked in the course schedule, corresponding to a bit less than one week. Students that do not take part in compulsory elements of the course are required to submit written summaries of the content of these moments to pass the course (1 HEC).
- 2) Final individual exam in written form (hall exam) on theoretical parts (4.5 HEC)
- 3) A group task presented as a written report and an oral presentation at a seminar (2 HEC)

**Form of teaching**

The forms of studies during the course include lectures, seminars, a computer simulation exercise, group exercises and one oral presentation. The course is given at daytime, fulltime.

*Language of instruction:* English

**Assessment**

In order to pass the course, the student must receive Pass on all three subparts. .

A student who has failed a test twice has the right to change examiners, if it is possible. A written application should be sent to the Department.

The number of examinations is limited to five occasions.

If the course is discontinued or major changes have been made, the student is guaranteed at least three examination occasions (including the ordinary examination occasion) during a time of at least one year from the last time the course was given in the original form.

**Grades**

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).  
The grading scale comprises Fail (U), Pass (G) and Pass with Distinction (VG).

In order to be awarded Pass for the whole course of 7,5 HEC, Pass is required on all three subparts. For Pass with Distinction on the course, Pass with Distinction (normally 80%) is required on subpart 2 and Pass on both subparts 1 and 3. On subparts 1 and 3, Fail (U) and Pass (G) are the only grades given.

**Course evaluation**

Both an oral and written (on GUL) evaluation will be done at the end of the course. The evaluation is mandatory and should be submitted at the latest one week after the last day of the course. The result of the evaluation will be presented on GUL, and also shown to the following year's students. It is very valuable for the teachers in their efforts to develop and improve the course.

