

# Syllabus

for course at advanced level

**Atmospheric Chemistry and Physics**  
**Atmosfärens fysik och kemi**

**7.5 Higher Education  
Credits**  
**7.5 ECTS credits**

<b>Course code:</b>	MI7022
<b>Valid from:</b>	Spring 2022
<b>Date of approval:</b>	2021-06-17
<b>Department</b>	Department of Environmental Science
<b>Main field:</b>	Environmental Science
<b>Specialisation:</b>	A1N - Second cycle, has only first-cycle course/s as entry requirements

## Decision

### Prerequisites and special admittance requirements

Admission to the course requires 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
HELA	Atmosphere	7.5

### Course content

This course provides an introduction into components of the atmosphere and their physical and chemical interactions.

The topics covered in this course include:

- A brief survey of the Atmosphere, especially the atmospheric surface layer
- Atmospheric thermodynamics and cloud formation
- Atmospheric trace constituents
- Photochemical processes
- Dry and wet removal processes for gases and aerosols
- Aerosols (primary and secondary sources, transformation, main chemical and physical properties)
- Cloud water chemistry
- Stratospheric chemistry

### Learning outcomes

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

- describe the structure of the atmosphere, including the surface layer,
- explain the basic thermodynamics that govern atmospheric processes, with special focus on cloud formation,
- name the main atmospheric trace constituents and be familiar with their life cycle,
- know the main photochemical processes taking place in the atmosphere,

- present the main removal processes for gases and aerosols,
- be familiar with the lifecycle of atmospheric aerosols,
- describe the main processes taking place in cloud droplets,
- be able to explain the basic components of the stratosphere and their role in radiative transfer.

### **Education**

Teaching consists of lectures, seminars, and exercises. Seminars and exercises are mandatory. The course is offered in English.

### **Forms of examination**

a. The course is examined as follows: Assessment takes place through written reports, oral presentations and a final exam as well as participation in seminars and exercises. The examination will be conducted in English.

b. A passing final grade requires participation in seminars and exercises. If special reasons exist, following consultation with the teacher involved, the examiner may grant the student exemption from the obligation to participate in certain compulsory instruction.

c. Grading: The course's final grade is set according to a seven-point criterion-referenced scale:

A = Excellent

B = Very good

C = Good

D = Satisfactory

E = Adequate

Fx = Fail, some additional work required

F = Fail, much additional work required

d. The course's grading criteria are handed out at the start of the course.

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 three examination opportunities per academic year the course is offered. For the academic years that the course is not offered, at least one examination opportunity is offered.

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

### **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 the course was discontinued. Requests must be made to the departmental board. The provision also applies in the case of revisions of the course syllabus and revisions of the required reading.

### **Misc**

The course is part of the Master's programme in Environmental Science, but may also be taken as a separate course.

### **Required reading**

The required reading is decided by the department board and published on the course page in the digital course catalogue at least 2 months before the start of the course.