

## **METN01, Physics: Atmospheric Environmental Chemistry, 7.5 credits**

*Fysik: Atmosfärisk miljö kemi, 7,5 högskolepoäng*  
Second Cycle / Avancerad nivå

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### **Details of approval**

The syllabus was approved by Study programmes board, Faculty of Science on 2012-02-13 to be valid from 2011-08-29, autumn semester 2011.

### **General Information**

The course is included in the main study field of Physics at the Faculty of natural Sciences and is offered to students at the Bachelor of Science Programme with a specialisation in Meteorology and Biogeophysics.

*Language of instruction:* English

*Main field of studies*

Physics

*Depth of study relative to the degree requirements*

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

### **Learning outcomes**

The aim of the course is that students should have acquired the following knowledge and skills on completion of the course:

#### **Knowledge and understanding**

On completion of the course, the student should:

- have a sense of concepts of size, and be able to estimate e.g. the density of an atmospheric particle, or be able to evaluate whether a given NO<sub>x</sub> level is high or low
- be able to evaluate what happens with a number of different substances (which are included in the course syllabus) when they are released into the atmosphere, have knowledge of their origin, and have a good understanding of the life-spans of these substances and their potential effects on the environment? both locally and globally

- be able to describe the properties of radiation from the Sun and the Earth, and be familiar with and understand the radiation balance of the Earth
- be able to account for photolysis and absorption of radiation in the atmosphere, describe the Greenhouse Effect and be familiar with the most important greenhouse gases
- be able to describe kinetics and mechanisms for decomposition in of different subjects in the atmosphere
- be able to account for the most important chemical processes in the troposphere
- be able to account for the chemical processes in the stratosphere and the mechanisms behind the decomposition of the ozone layer
- be able to set up the mechanisms for deposit of gases and particles
- be familiar with the chemical processes that take place in water drops, and be able to account for the physical chemistry that decides how easily a substance is assimilated in a water drop
- be familiar with the principles of the formation of particles and their cycle in the atmosphere
- be able to graphically account for the different sizes of atmospheric particles, their life-spans, and their most important chemical components
- be able to discuss climate changes and account for mechanisms and reasons for human influence on the climate.

## Course content

The course deals with seven main fields of study:

1. Atmospheric chemistry and kinetics
2. Chemistry of the stratosphere
3. Chemistry of the troposphere
4. Chemistry of the aqueous phase
5. Particles
6. Deposition
7. Climate

## Course design

The course consists of lectures, exercises and computer exercises.

## Assessment

The course is completed with an individual oral test, that is carried out after the written assignments have been passed. A part of the test will be based on one of the reports the student has handed in during the course. The course is graded on a seven-degree scale, under the supervision of an external examiner.

Re-examination is offered under the same preconditions as regular examination.

*Subcourses that are part of this course can be found in an appendix at the end of this document.*

## Grades

Marking scale: Fail, Pass, Pass with distinction.

The course is graded according to the Danish system, where:

The grade 12 is given for an achievement where the student in a convincing way has demonstrated independence, overview and understanding in the details linked to the learning outcomes of the course. The grade 2 is given for an achievement where the student masters only the minimum essentials of the above stated learning outcomes.

The grades are translated to the U-V grading scale by the Department of Physics.

## **Entry requirements**

For admission to the course, the partaking in FYSA21, METC01 and METC02, and passed English B, is required.

## **Further information**

The course syllabus is a translation of the Danish original.

## Subcourses in METN01, Physics: Atmospheric Environmental Chemistry

Applies from H11

1201 Atmospheric Environmental Chemistry, 7,5 hp  
Grading scale: Fail, Pass, Pass with distinction