

**SYLLABUS**

# **Atmospheric dynamics and climate 7.5 credits F7002E**

**Atmosfärsdynamik och klimat**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

**DECISION DATE  
2021-02-16**

# Atmospheric dynamics and climate 7.5 credits F7002E

## Atmosfärsdynamik och klimat

### Second cycle, F7002E

| Education level | Grade scale | Subject    | Subject group (SCB) |
|-----------------|-------------|------------|---------------------|
| Second cycle    | G U 3 4 5   | Rymdteknik | Space Technology    |

### Main field of study

Space Technology

## Entry requirements

Basic knowledge in mathematics equivalent to 22.5 credits, for example, three of Differential Calculus M0047M, Linear Algebra and Calculus M0048M, Linear Algebra and Differential Equations M0049M, Multivariable analysis M0055M. Basic physics corresponding to 22.5 credits, for example, three of the F0004T Physics 1, Physics 2 F0005T, 3 F0006T Physics, Electromagnetic Field Theory F0007T. Atmospheric Physics F7004R and F0030T Continuum Mechanics II or F0008T.

Good knowledge in English equivalent to English 6.

## Selection

The selection is based on 30-285 credits

## Course Aim

.Knowledge and understanding

After the course, students should be able to show deep understanding how the basic physical principles drive dynamic and thermodynamic processes in the atmosphere. The student should be able to show understanding of how these processes are related to the climate.

Competence and Skills

The student should be able to discuss how different components of the dynamic system react to changes and how they are related to each other.

The student should be able to describe how dynamic processes can be described in different coordinate systems and show an understanding of how they can be used in weather and climate models.

The student should be able to operate a simple climate model and analyse and discuss the simulation results. Students should be able to describe and analyze different parameters in the climate system, their variation and sensitivity. He / she should be able to handle climate data, visualize them and apply different methods of analysis.

evaluation ability and approach

Students should be able to discuss parameters and data concerning dynamic and thermodynamic processes, climate processes and the correlation between different parameters. They must be able to present their analyzes and results within the framework of the given tasks

## Contents

Equations driving the climate system, radiation balance, atmospheric dynamics and thermodynamics, energetics, and exchange processes. Climate variability, modeling of the climate system, the observation of the climate, climate change.

## Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

The course consists of classical lectures, combined with homework problems for the students. In parallel the students will work with a climate model and do their own climate sensitivity project. Upcoming public discussions and new findings and observations are discussed.

## Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. The course grade will be determined by a the student's home work assignments and the written and oral presentation of their course project. The final grade considers all parts of the examination and will be decided when all obligatory elements are fulfilled.

## Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

## Overlap

The course F7002E is equal to F7011R

## Course offered by

Department of Computer Science, Electrical and Space Engineering

## Modules

| Code | Description       | Grade scale | Cr  | Status    | From period | Title |
|------|-------------------|-------------|-----|-----------|-------------|-------|
| 0006 | Assignment report | G U 3 4 5   | 5   | Mandatory | A21         |       |
| 0007 | Project work      | G U 3 4 5   | 2.5 | Mandatory | A21         |       |

## Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

## Last revised

by Jonny Johansson, HUL SRT 2021-02-16

# Syllabus established

by Jonny Johansson, HUL SRT 2017-02-15