



**LUND**  
UNIVERSITY

Faculty of Science

## NGEA17, Synoptic/mesoscale meteorology, 7.5 credits

*Synoptisk/mesoskalig meteorologi, 7,5 högskolepoäng*

First Cycle / Grundnivå

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### Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2013-01-09 to be valid from 2013-01-09, spring semester 2013.

### General Information

The course is a compulsory course for first-cycle studies for a science Bachelor's programme, specialisation meteorology at Lund university. The course is also given as a freestanding course. The course is given in English.

*Language of instruction:* English

*Main field of studies*

Physics

*Depth of study relative to the degree requirements*

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

### Learning outcomes

The aim of the course is to give insight in the basic theory and practice that is used to describe the dominating weather systems on synoptic scale and mesoscale. The course should give an understanding of their application in modern weather services. Knowledge and understanding On completion of the course, the student should be able to: account for the secondary circulation in the quasi-geostrophic equation system give a physical explanation to the quasi-geostrophic equation systems, the geopotential tendency equation and the omega-equation explain the movements of the large-scale pressure systems from both from the quasi-geostrophic equations and from potential vorticity, describe the development of extra-tropical cyclones based on both the quasi-geostrophic equations and potential vorticity, account for kinematic front genesis in the troposphere account for convection in the troposphere including the formation of multi and super cells. Skills and ability On completion of the course, the student should be able to: explain the origin of jet streams in the troposphere and account for their influence on extra-tropical cyclone genesis identify the weather systems (including fronts and jet streams) and their developmental stages by means of

meteorological satellite images. Judgement and approach On completion of the course, the student should: have obtained a consciousness about the theoretical background of the development and movements on the synoptic scale of the weather systems and with safety be able to use this understanding in meteorological applications.

## **Course content**

The course describes the dynamics of the more important weather systems, mainly based on the quasi-geostrophic theory. Identifiable weather systems of different magnitudes from some hundred kilometers (mesoscale) to the moving high- and low pressure systems on several thousand kilometers (synoptic scale), are described and dynamically analysed. Further, the course also includes theory of organised deep convection. In the course, satellite images of typical weather development are used to illustrate the structure and dynamics of the current weather phenomenon.

## **Course design**

The teaching consists of lectures, calculation exercises and seminars. Participation in seminars and calculation exercises are compulsory.

## **Assessment**

Examination takes place via written assignments and presentations in seminars during the course and a written exam. For students who have failed the regular examination, additional occasion in close connection to this is offered.

*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.

A Pass grade in the entire course requires approved examination and passed written assignments.

## **Entry requirements**

For admission to the course, basic university qualification is required, physics knowledge equivalent to FYTA14 (fluid dynamics) and meteorology equivalent NGEA16 (dynamic meteorology and numerical weather forecasts).

## **Further information**

The course may not be included in a higher education qualification together with: METD02

## Subcourses in NGEA17, Synoptic/mesoscale meteorology

Applies from H13

1301 Synoptic/Mesoscale Meteorology, 7,5 hp  
Grading scale: Fail, Pass, Pass with distinction