Department of Meteorology

Stockholm University

Syllabus

for course at first level

Fluid mechanics
Strömningsmekanik

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	MO5001
Valid from:	Autumn 2018
Date of approval:	2018-01-15
Department	Department of Meteorology
Main field:	Physics
Specialisation:	G2F - First cycle, has at least 60 credits in first-cycle course/s as entry requirements

Decision

This syllabus has been approved by the Board of Science at the Faculty of Science, at Stockholm University 2018-01-15.

Prerequisites and special admittance requirements

Course structure

Examination code	Name	Higher Education Credits
HELA	Fluid Mechanics	7.5

Course content

The course treats:
•Partial differential equations and vector analysis
•The Navier-Stokes equation and the continuity equation
•Potential flow, streamlines and trajectories
•Dimensional analysis, Reynolds number, Rayleigh number, laminar and turbulent flow
•Flow in rotating systems
•Derivation and applicability of the shallow water equations
•Rossby number, fast and slow mode, reduction to quasi-geostrophy
•Waves and instabilities

Learning outcomes

Expected study results

After completing the course the student should be able to:
•Explain and apply fundamental fluid-dynamical concepts and identify fluid-dynamical flow types
•Perform dimensional analysis of various systems of fluid equations
•Explain and apply fluid-dynamical theory to analyse flow phenomena
•Derive a linear dispersion relation from a nonlinear system of equations

Education

The teaching consists of lectures, calculation exercises and laborations. Participation in laborations and the associated group tutorials is compulsory. If there are special reasons, the Examinator may, after consulting the

course teacher, allow the student to omit certain parts of the compulsory teaching.

Forms of examination

a) Examination is done by a written and oral test and written reports from laboration. Examination can be in English.
b) Grading is done on a seven-step scale: A = Excellent B = Very good C = Good D = Satisfactory E = Sufficient Fx = Failed, some more work is required F = Failed, a lot more work is required.
c) The grading criteria are handed out at the beginning of the course.
d) For passing the course, at least grade E is required, as well as passed written presentations of laborations and participation in all compulsory teaching.
e) Students that do not pass the regular test have the right to take further tests as long as the course is given. The number of tests is not limited. As "tests" are understood also other compulsory parts of the course. Students that have passed a test are not allowed to attempt another test in order to receive a higher grade. Students that have failed an examination twice, for a course or part of a course, have the right to request that another Examinator is appointed, unless special reasons speak against this. The request for this should be directed to the Board of the department. The course has at least two examination occasions per academic year the years teaching is given. Intermediate years at least one examination occasion is given.
f) A student who receives grade Fx has the opportunity to do additional work in order to reach grade E. The Examinator decides what additional work is required and the criteria to pass. The additional work should be performed prior to the next examination occasion.

Required reading

The course literature is published on the Department of Meteorology's website at least two months prior to course start.