



SG2219 Advanced Compressible Flows 7.5 credits

Kompressibel strömning, avancerad kurs

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for SG2219 valid from Autumn 2018

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Specific prerequisites

The course is suitable for students in Engineering physics, Mechanical engineering and Vehicle- and Maritime engineering in the fourth year with interest in fluid dynamics and aerodynamics as well as for students in e.g. the international masters program in engineering mechanics. The course is given during period 1 and 2.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After this course the students should, depending on which topics are treated, be able to:

- a) understand how a viscous boundary layer develops at high Mach numbers and calculate the velocity and temperature fields.
- b) calculate shock-wave propagation in two dimensions
- c) understand the coupling between chemical reactions and flow in a gas.
- d) extend the thermodynamic concepts to high temperatures

Course contents

The course mainly deals with the following four topics:

- Laminar compressible boundary layers
- Thermodynamics for hypersonic applications

In addition a topic of current interest in compressible flow will be covered. The chosen topic is specific for each course round. Possible topics are, e.g.

- Detonation and deflagration waves
- Kinetic gas theory
- Propagation of shock waves

Each part is covered in about 12h lectures/seminars. Parts of the course are closely related to research projects at KTH Mechanics.

Disposition

Each topic corresponds to about 2,5 credits, covered under 12h lectures/seminars and assignments. The course partly addresses current research topics at KTH/Mechanics.

Course literature

Andersson, Modern Compressible Flow (Chapters 16 & 17 for topic on hypersonic applications).

Distributed material (for other course topics).

Examination

- SEM1 - Seminars, 1.5 credits, grading scale: P, F

- SEM2 - Seminars, 1.5 credits, grading scale: P, F
- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

Assignments (1,5+1,5 hp), exam (4,5 hp). (Period 1, 3,5 hp och period 2, 4 hp.)

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.