SG2123 Mathematical Methods of Mechanics, General Course 6.0 credits

Mekanikens matematiska metoder, allmän kurs

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

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

Establishment

Course syllabus valid from Fall 2022

Grading scale

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

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

English B / English 6

Compulsory courses within the competence program Mechanics.

Language of instruction

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

Intended learning outcomes

The course aims at an understanding of important phenomena and methods of modern mechanics, introduced in the contexts of oscillations-ODE and waves-PDE.

Course contents

Asymptotic series, local and uniform expansions. Strongly damped systems, boundary layer theory, WKB method. Periodic and transient motion, Lindstedt's method and multiple scales. Non-linear phenomena and theory of stability. Averaging approximations. Wave equation and Green functions. Approximations for short and long wave lengths. Non-linear waves, kinematic waves. Hyperbolic waves and 1D gas dynamics. Dispersive waves and the method of steepest descent.

Examination

- INL1 - Hand in Task, 1.5 credits, grading scale: P, F
- TENA - 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.

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.