SF2528 Numerical Methods for Differential Equations II 7.5 credits

Numeriska metoder, för differentialekvationer II

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

Establishment

Course syllabus for SF2528, valid from Autumn 2024

Grading scale

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

Education cycle

Second cycle

Main field of study

Mathematics, Technology

Specific prerequisites

English B / English 6

Completed basic course in numerical analysis (SF1550, SF1544, SF1545 or equivalent)

Completed basic course in differential equations (SF1692, SF1633, SF1683 or equivalent)

Language of instruction

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

Intended learning outcomes

After completing the course, the student shall be able to:

- explain key concepts and fundamental ideas within numerical methods covered in the course, and be able to describe the advantages and limitations of the methods.

- apply and implement the numerical methods covered in the course to solve specific problems involving partial differential equations

- analyze the well-posedness of certain partial differential equations and estimate errors for the methods covered in the course

Course contents

The course covers numerical treatment of inital value problems and boundary value problems for partial differential equations, including finite element methods and finite volume methods. The focus of the course is specifically on the theoretical and computational understanding of methods based on a weak formulation for linear elliptic, parabolic, and hyperbolic partial differential equations, as well as time discretizations. The course also addresses non-linear hyperbolic partial differential equations and stabilization. The emphasis on different aspects may vary from year to year. The course includes computerlabs and projects with various applications.

Examination

- LABA - Laboratory assignments, 2.0 credits, grading scale: P, F
- LABB - Laboratory assignments, 2.0 credits, grading scale: P, F
- TEN1 - Written exam, 3.5 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.

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.