



SI1200 Mathematical Methods in Physics 4.0 credits

Fysikens matematiska metoder

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 for SI1200 valid from Autumn 2017

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Language of instruction

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

Intended learning outcomes

Upon completing the course a student shall be able to:

- Formulate problems in terms of differential equations based on fundamental physical problems
- Use expansion in eigenfunctions as a tool to solve stated problems that appear in, e.g., quantum mechanics and electromagnetism
- Define and in basic situations apply Green's functions on physical problems such as diffusion and wave propagation
- Analyse physical problems using variational principles and energy arguments

Course contents

Physical problems leading to different types of differential equations, e.g., the wave equation, Laplace's equation, and Poisson's equation.

Separation of variables in Cartesian, cylinder, and spherical coordinates. Bessel functions, Legendre polynomials, and spherical harmonics. Introductory theory and application of Green's function methods in physics. Variational calculus and physical modelling using energy arguments.

Specific prerequisites

Recommended previous knowledge: In order to assimilate the course material, it is recommended that the student has previously taken the following courses, or obtained the corresponding knowledge by other means:

- Single variable calculus
- Multi variable calculus
- Linear algebra
- Vector analysis

It is also recommended that the first part of the course in differential equations and transforms as well as complex valued functions has been studied.

Course literature

The course literature is decided by the department and communicated to the students via the course homepage at least four weeks before the start of the course.

Examination

- TEN1 - Exam, 4.0 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.

Other requirements for final grade

At least grade E in the exam. In the normal case, the exam should be a written exam.

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.