



Faculty of Health, Science and Technology
Physics

Syllabus

Mathematical Physics

Course Code:	FYAD18
Course Title:	Mathematical Physics <i>Matematisk fysik</i>
Credits:	7.5
Degree Level:	Master's level
Progressive Specialisation:	Second cycle, has only first-cycle course/s as entry requirements (A1N)

Major Field of Study:
FYA (Physics)
TKA (Engineering Physics)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2024-01-31, and is valid from the Autumn semester 2024 at Karlstad University.

Prerequisites

45 ECTS credits in Physics and 30 ECTS credits in Mathematics, including Complex Analysis and Transforms, 7.5 ECTS credits, plus upper secondary level English 6, or equivalent

Learning Outcomes

Upon completion of the course, students should be able to:

- give an account of physical problems leading to partial differential equations,
- give an account of and apply other mathematical structures and methods treated in the course,
- give an account of and solve important differential equations in physics for several types of boundary conditions, and
- give an account of and apply different orthogonal function systems.

Content

Physical problems leading to partial differential equations, properties of linear partial differential equations, choice of coordinate system, separation of variables, the Frobenius method, non-homogeneous equations, singular points, Green functions, Sturm-Liouville theory, Fourier series, as well as other function systems of relevance to physics such as the Gamma function, Bessel functions, Legendre functions, Hermite functions, and Laguerre functions.

Reading List

See separate document.

Examination

Assessment is based on a written exam, an oral exam, and hand-in assignments.

If students have a decision from Karlstad University entitling them to Targeted Study Support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

Grades

One of the grades Distinction (VG), Pass (G) or Fail (U) is awarded in the examination of the course. Engineering students are awarded one of the grades 5 (Pass with Distinction), 4 (Pass with some Distinction), 3 (Pass) or U (Fail).

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional information

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.