



Faculty of Health, Science and Technology
Mathematics

Syllabus

Applied Mathematics

Course Code:	MAGA48
Course Title:	Applied Mathematics <i>Tillämpad matematik</i>
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

Major Field of Study:
MAA (Mathematics)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2018-08-22, and is valid from the Spring semester 2019 at Karlstad University.

Prerequisites

Attended courses Mathematics for Engineers I, 7.5 ECTS credits and Mathematics for Engineers II, 7.5 ECTS credits, or equivalent

Learning Outcomes

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

- determine eigenvalues and eigenvectors and calculate with tensors,
- apply solution methods for ordinary differential equations and systems of ordinary linear differential equations,
- calculate partial derivatives and use these to solve problems,
- apply concepts and methods in descriptive statistics, perform basic calculations in probability theory and use normal distribution to solve applied problems,
- use mathematical software to solve problems when relevant,
- check results and assess their reasonableness and accuracy, and
- demonstrate understanding of the subject by combining new concepts, theorems and problem solving skills, and by identifying analogies and making generalizations.

Content

- Vectors, matrices, eigenvalues and eigenvectors, tensors, some basic properties and applications (in elasticity).
- Linear ordinary differential equations of higher order, linear eigenvalue problems, eigenfunctions, systems of linear ordinary differential equations.
- Heaviside's step function and Dirac's delta distribution.
- Functions of several variables, partial derivatives, directional derivative, gradient and some simple

partial differential equations.

- Introductory probability theory, descriptive statistics, some measures of central tendency, dispersion and dependence, some common probability distributions, e.g. normal distribution.

Reading List

See separate document.

Examination

Assessment is based on an individual written exam and a hand-in assignment. The number of examination opportunities is limited to three.

Grades

One of the grades U (Fail), 3 (Pass), 4 (Pass with Some Distinction) or 5 (Pass with Distinction) is awarded in the examination of the course.

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.

Required course for the mechanical engineering and the innovation and design engineering programmes.