Faculty of Health, Science and Technology
Mathematics

Syllabus

Mathematics for Engineers II

Course Code:	MAGA82
Course Title:	Mathematics for Engineers II *Matematik för ingenjörer II*
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 2024-03-07, and is valid from the Autumn semester 2024 at Karlstad University.

Prerequisites
Registered for Mathematics for Engineers I, 7.5 ECTS, or equivalent.

Learning Outcomes
Upon completion of the course, students should be able to:
- use basic concepts in vector algebra in two and three dimensions when solving problems,
- solve systems of linear equations and perform calculations with elementary matrix algebra,
- apply common integration methods, such as partial integration, variable substitution, and partial fraction decomposition,
- use integrals in applications, such as computing work, areas of flat surfaces, and volumes of rotation,
- solve first-order linear or separable ordinary differential equations,
- solve linear ordinary differential equations with constant coefficients,
- combine different concepts, theorems, and problem-solving experiences, recognising

analogies and making generalisations, and
- assess the reasonableness of results and partial results, and, where possible, verify correctness.

Content
- Vectors in the plane and space, scalar and vector product, equations for lines and planes, distance between a point and a line or a point and a plane.
- Systems of linear equations, Gaussian elimination, matrices, inverse matrices, determinants of order 2 and 3.
- Integrals: primitive functions, fundamental theorem of calculus, partial integration, variable substitution, integration of rational functions.
- Applications of integrals such as area calculation of flat surfaces and volumes of rotation.
- First-order linear and separable ordinary differential equations, as well as linear ordinary differential equations with constant coefficients.

Reading List
See separate document.

Examination
Assessment is based on a written exam. The number of examination opportunities is limited to three per academic year.

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. For students in Engineering, one of the grades 5 (Pass with Distinction), 4 (Pass with Some Distinction), 3 (Pass), or U (Fail) 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.