Faculty of Health, Science and Technology
Mathematics

Syllabus

Course Approval
The syllabus was approved by the Faculty Board of Health, Science and Technology on 13 October 2014 , and is valid from the Spring semester of 2015 at Karlstad University.

Course Code: MAGC07
Linear Algebra II, 7.5 ECTS Credits
(Linjär algebra II, 7.5 Swedish credit points)
Degree Level: Bachelor
Progressive Specialisation: G2F (First cycle, has at least 60 credits in first-cycle course/s as entry requirements)

Language of Instruction
Swedish or English

Prerequisites
Mathematics 60 ECTS cr of which at least 45 ECTS credits are completed, including MAGA04 Linear Algebra 7.5 ECTS cr, or equivalent.

Major Field of Study
MAA (Mathematics)

Learning Outcomes

Upon completion of the course, students should be able to:
- determine the Jordan normal form of matrices,
- solve systems of linear differential equations with constant coefficients,
- give an account of central concepts and definitions treated in the course and formulate key results and theorems covered in the course,
- prove a given selection of course theorems,
- use course theory, methods and techniques to solve mathematical problems,
- independently solve mathematical problems and give an account of the solutions, orally and in writing.

Content and Form of Instruction

General vector spaces and linear matrices. Sum and direct sum of vector spaces. Dimension formula. Nilpotent and cyclic matrices. Tensor products of vector spaces and linear matrices. Diagonalisation of linear operators. Inner product spaces. Introduction to Hilbert spaces. Isometries. Riesz representation theorem and adjoint operators. Self-adjoint operators. Spectral theorem. Multilinear and quadratic forms. The norm of a linear operator. Positive definite and positive semidefinite operators. Sylvester's law of inertia. Generalized eigenvectors. Jordan normal form of matrix. Square roots of matrices. Minimal polynomial and Hamilton-Cayley's theorem. Matrix exponential function. Systems of linear differential equations with constant coefficients.

Students carry out a minor project individually.

Reading List

See separate document.

Examination

Assessment is based on a written exam and an oral and written presentation of a project.

The number of examination opportunities are limited to three per academic year.

Grades

One of the grades Fail (U), Pass (G), or Distinction (VG) 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 assessment is based on student views and experiences as reported in written course evaluations and/or group discussions. Students will be informed of the result of the evaluation and of the measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional Information

Students who enrolled before 1 July 2007 will complete their studies in accordance with the requirements of the earlier admission. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

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

Required course for the Mathematics programme NGMAA.

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