FME3542 Mathematics 7.5 credits

Matematik

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 FME3542 valid from Spring 2019

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

University studies of at least 180 higher education credits of which at least 30 credits in mathematics / statistics / qualitative analysis or equivalent and documented proficiency in English B or equivalent.

Language of instruction

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

Intended learning outcomes

After completing the course, participants will be able to:

- Demonstrate fundamental understanding in linear algebra and probability theory
- Demonstrate understanding in Fundamental Theorem of Linear Algebra, Cramer's rule, and the Spectral Theorem
- Demonstrate basic understanding in topics such as sample space, conditional probability, independence, expected value, variance, and moment-generating function
- Demonstrate ability to handle discrete and continuous distributions including the bivariate normal distribution.
- Demonstrate basic understanding in convergence, the central limit theorem, the law of large numbers, the delta method, and maximum likelihood estimation.

Course contents

The course covers fundamental topics in linear algebra and probability theory. In the linear algebra part, concepts such as linear dependence, linear function, matrix, matrix multiplication, inverse matrix, determinant, eigenvalue, eigenvector, definiteness, idempotent matrix, projection matrix, and orthogonal projection matrix are defined. Results such as the Fundamental Theorem of Linear Algebra, Cramer's rule, and the Spectral Theorem are discussed.

In the probability part concepts such as sample space, conditional probability, independence, expected value, variance, and moment-generating function are introduced. The most common discrete and continuous distributions are covered, including the bivariate normal distribution. Finally, various forms of convergence, the central limit theorem, the law of large numbers, the delta method, and maximum likelihood estimation are discussed.

Examination

- TEN1 - Exam, 6.0 credits, grading scale: P, F
- ÖVN1 - Exercises, 1.5 credits, grading scale: P, 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.

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.