



APPLIES TO ACADEMIC YEAR 2016/2017

ELE 3719 Mathematics elective

Programme

Elective

Responsible for the course

Pål Lauritzen

Department

Department of Economics

Term

According to study plan

ECTS Credits

7,5

Language of instruction

Norwegian

Introduction

This course gives an introduction to selected topics in mathematics and probability theory.

Learning outcome

Acquired knowledge

Upon completing this course, the student should have acquired mathematical knowledge in selected topics that are important for finance, economics and statistics. The student should:

- Know important concepts in linear algebra and vector calculus, such as matrices, vectors, determinants and quadratic forms, and know how to use these in optimization and multivariate statistics.
- Understand probability models from a mathematical point of view.
- Know the concept differential equation, and know how differential equations can be used for modelling.
- Understand foundations of calculus of variations and optimal control theory, and know how this theory can be used in economics.

Acquired skills

Upon completing this course, the student should have acquired skills including:

- Mastery of calculations with matrices, vectors and determinants, find eigenvalues and eigenvectors, and ability to use this in applications.
- Ability to compute with probabilities and probability models in one or several variables, and to use this in applications.
- Ability to solve selected types of differential equations, with and without initial conditions.
- Ability to solve selected optimization problems.

Reflection

Upon completing this course, the student should have strengthened his/her analytical thinking, and have realized the value of precise and systematic work.

Prerequisites

The course builds on MET 1180 Mathematics, or MET 2910 Mathematics.

Compulsory reading

Books:

Stirzaker, David. 1999. Probability and random variables : a beginner's guide. Cambridge University Press. Kapittel 1-6

Recommended reading

Books:

Sydsæter, Knut ... [et al.]. 2014. Further mathematics for economic analysis. 3rd ed. Financial Times/Prentice-Hall. Kap. 1, 5-6, 8

Course outline

- Linear algebra and vector calculus
- Probability theory
- Differential equations
- Optimal control theory

Computer-based tools

Not used in this course.

Learning process and workload

The course has 45 hours of lectures. There will be work programmes with problems that the student should solve. Some of the problems will subsequently be solved in class.

Some time in class will be set aside for the students to work on basic problems in topics recently covered in lectures. This will activate the students and increase the learning outcome through the presentation of solutions to the problems.

| Activity | Workload |
|--------------------------------------|-------------|
| Participation in class | 45 |
| Independent work on problems | 100 |
| Reading of literature | 50 |
| Examination | 5 |
| Total recommended use of time | 200h |

Use of hours

45 hours of lectures.

Examination

A five hour individual written examination concludes the course.

Examination code(s)

ELE 37191 - Written examination, accounts for 100% of the final grade in ELE 3719 Mathematics elective - 7.5 credits.

Examination support materials

BI approved exam calculator. Examination support materials at written examinations are explained under examination information in the student portal @bi. Please note use of calculator and dictionary in the section on support materials (https://at.bi.no/EN/Pages/Exa_Hjelpemidler-til-eksamen.aspx).

Re-sit examination

For electives re-sit is normally offered at the next scheduled course. If an elective is discontinued or is not initiated in the semester it is offered, re-sit will be offered in the electives ordinary semester.

Additional information