



# IX1306 Mathematics for Economic Applications 7.5 credits

Matematik för ekonomiska tillämpningar

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 IX1306 valid from Autumn 2008

## Grading scale

A, B, C, D, E, FX, F

## Education cycle

First cycle

## Main field of study

Mathematics, Technology

## Specific prerequisites

## Language of instruction

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

## Intended learning outcomes

**GENERAL OBJECTIVES** After course completion the student should be able to formulate, analyze and solve mathematical problems significant in the Economics sphere with in-depth knowledge of concepts and methods of the upper secondary school mathematics- translate the mathematical model into mathematical programming language- analyze, review and make conclusions from a solution

**DETAILED OBJECTIVES** After course completion the student should be able to- use some of the calculus' fundamental concepts - such as function, continuity and derivative - and be able to read economic text containing those concepts and mathematical notation- use the most important properties of some elementary functions, especially polynomials, exponentials and logarithms, in order to study economics- follow certain economic reasoning involving the series concept - use the product rule, the quotient rule and the chain rule in order to find the derivative of elementary functions- use the derivative as a tool in order to study elementary functions, especially in finding extreme values and the study of growth and decay in economics- use Taylor's formula for making simple approximations- calculate fundamental integrals and use them in applications- calculate partial derivatives to simple functions- follow certain reasoning in economics involving functions of several variables

The student is also assumed to seize comprehensive knowledge and insight such as to be able to- follow simple mathematical reasoning and read simple mathematical text with prevalent usage and notation- understand how mathematics is used in economic modelling- use a computer in order to . illustrate data sets . plot functions . make function fits to given data . compute limits, derivatives and integrals . solve equations . solve linear systems of equations . set up and solve optimization problems in economics

## Course contents

**Single variable calculus:** Numbers, functions and economic models. Elementary functions, especially polynomials, exponentials and logarithms. Continuity, derivative, rules of differentiation. Applications of derivative, especially extreme value problems. Taylor's formula. An introduction to number sequences and series. Integrals with applications.

**Calculus with several variables:** An introduction to functions of several variables with economic applications; partial derivatives, differentiability, Jacobian matrix, gradient and directional derivative and possibly an introduction to optimization of multiple variable functions-

**Linear algebra:** Linear system of equations, matrices, determinants, vectors, inverse matrix, an introduction to linear transformations

## Disposition

The teaching method is problem oriented and computer aided. The education time is evenly distributed among the three main topics- conceptual understanding and modelling- algorithms- conclusions and synthesis.

## Examination

- INL1 - Assignments, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Examination, 1.5 credits, grading scale: P, F
- TEN2 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, 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.

A/B/C/D/E/Fx/F

## Other requirements for final grade

**Written exam mathematical programming language (TEN1; 1.5hp) Written exam (TEN2; 3hp) Problem assignments (INL1; 3hp)**

## 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.