ML0024 Mathematics for Technical Preparatory Year II 12.0 credits

Matematik för basår II

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 ML0024 valid from Spring 2021

Grading scale

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

Education cycle

Pre-university level

Specific prerequisites

Language of instruction

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

Intended learning outcomes

The overall goal of the course is to give new students enough skills and understanding to be able to follow the mathematical courses that are included in the 3- and 5-year engineering programs. The courses should also contribute to a good introduction to higher education.

On completion of the course, the student should

- be able to use theorems and methods on mathematical problems, also without digital aids, and communicate the mathematical argumentation in writing.

'Mathematical' refers to the part of the mathematics that is included in the course content.

Course contents

Course unit A: TENA

- **Trigonometry**; Unit circle. Trigonometric identities. The addition and subtraction theorems. Trigonometric equations. Trigonometric graphs. Radians. Derivatives of trigonometric functions.
- **Proof techniques:** Direct proofs. Indirect proofs. Proofs by contradiction.
- **Derivatives.** Derivatives of composite functions. Product rule. Quotient rule. Relationships between change rates. Asymptots.
- **Integrals;** Primitive function. Integrals and areas.

Course unit B: TENB

- **Number sequences**; Recursion formulae. Arithmetic number sequence. Geometric number sequence.
- **Complex numbers;** Rectangular form. Complex conjugates. Absolute values. Arithmetic rules. The complex plane. Polar form. Exponential form. De Moivre's formula. Euler's formula.
- **Polynomial equations;** Polynomial long division. The factor theorem.
- **More of derivatives and integrals;** Repetition of basic concepts. Linear approximation. Change rates. Extreme values. Integrals and area calculations. Partial integration. Solids of revolution
- **Differential equations.** Differential equations of the first order. Inhomogeneous differential equations. Differential equations of the second order. Separable differential equations.

Examination

- TENA - Written examination, 6.0 credits, grading scale: A, B, C, D, E, FX, F
- TENB - Written examination, 6.0 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.

Other requirements for final grade

Final grades are based on the total of points from both examinations.

For final grade, it is required that all examination parts are approved.

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.