



Course syllabus

Tekniskt basår: Matematik 4 Pre-University Course in Technical Sciences: Mathematics 4

TBAA10, 9 credits, G1 (First Cycle)

Valid for: 2023/24 Faculty: Faculty of Engineering, LTH Decided by: PLED TB Date of Decision: 2023-04-19

General Information

Compulsory for: TNB1-TEBA, TNB1-NABA **Language of instruction:** The course will be given in Swedish

Aim

The purpose of the course is to complete an upper secondary school education in Mathematics 4.

Learning outcomes

Knowledge and understanding For a passing grade the student must

Does not exist in this form.

Competences and skills For a passing grade the student must

Does not exist in this form.

Judgement and approach For a passing grade the student must

Does not exist in this form.

Contents

Mathematics 4, Part a

• Handling trigonometric expressions, and proof and use of trigonometric formulae including the Pythagorean trigonometric identity and the addition formulae.

• Algebraic and graphical methods for solving trigonometric equations.

• Properties of trigonometric functions, logarithmic functions, compound functions and absolute amounts as functions.

• Drawing graphs and their related asymptotes.

• Derivation and use of the rules of derivation for trigonometric, logarithmic, exponential and compound functions, and also the product and quotients of functions.

• The concept of differential equations and their properties in simple applications that are relevant to subjects typical of programmes.

• Strategies for mathematical problem solving including the use of digital tools and programming.

• Mathematical problems of importance in societal life and applications in other subjects.

• Mathematical problems related to the history of mathematics.

Mathematics 4, Part b

• Methods of calculating complex numbers written in different forms including rectangular and polar forms.

• The complex number plane, representation of complex numbers as points and vectors.

- Conjugates and absolute amounts of a complex number.
- Use and proof of de Moivre's formula.
- Algebraic and graphical methods for solving simple polynomial equations with complex roots and real polynomial equations of higher degrees, also by means of the

factor theorem.

• Properties of trigonometric functions, logarithmic functions, compound functions and absolute amounts as functions.

• Algebraic and graphical methods for determining integrals with and without digital tools, including estimates of magnitudes.

• Different methods of proof in mathematics, with examples from the areas of arithmetic, algebra or geometry.

• Strategies for mathematical problem solving including the use of digital tools and programming.

• Mathematical problems of importance in societal life and applications in other subjects.

Mathematical problems related to the history of mathematics.

Examination details

Grading scale: UG - (U,G) - (Fail, Pass) **Assessment:** Written examinations

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts

Code: 0120. Name: Written Exam, Part a. Credits: 4,5. Grading scale: UG. Assessment: Written examination. Code: 0220. Name: Written Exam, Part b. Credits: 4,5. Grading scale: UG. Assessment: Written examination.

Admission

The number of participants is limited to: No

Reading list

- Alfredsson m fl: Matematik 5000+, kurs 4, Lärobok, Digital. Natur&Kultur, 2020, ISBN: 9789127458246. Alternative litterature.
- Alfredsson m fl: Matematik 5000+, kurs 4, Lärobok. Natur&Kultur, 2020, ISBN: 9789127455771.

Contact and other information

Course coordinator: Jenny Olsson, jenny.olsson@math.lth.se **Course homepage:** http://www.lth.se/utbildning/tekniskt-basar/ **Further information:** The scope for this course is expressed in access education credits (fup).