

## KURSPLAN

# Pathway Mathematics, 7,5 högskolepoäng

*Pathway Mathematics, 7.5 credits*

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Kurskod:	PMAX13	Utbildningsnivå:	Grundnivå
Fastställd av:	Utbildningsrådet 2023-05-12	Utbildningsområde:	Naturvetenskapliga området
Gäller fr.o.m.:	2023-08-21	Ämnesgrupp:	MA1
Version:	1	Fördjupning:	GXX

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### Lärandemål

On completion of the course, the students will be able to

Kunskap och förståelse

1. Display knowledge and understanding of elementary mathematical functions.
2. Display knowledge and understanding of basic trigonometry.
3. Display knowledge and understanding of sequences and series, especially the geometric series.
4. Display knowledge and understanding of basic single variable differential- and integral calculus.
5. Display knowledge and understanding of basic numerical methods and mathematical modelling.
6. Display knowledge and understanding of the concept of vectors.
7. Display basic knowledge of complex numbers.

Färdighet och förmåga

8. Demonstrate ability to transform and simplify algebraic expressions.
9. Demonstrate skills of solving equations and inequalities of various sorts.
10. Demonstrate skills of calculating derivatives and basic integrals for elementary functions.
11. Demonstrate ability to use derivatives to analyze the properties of a given function and to methodically solve optimization problems.
12. Demonstrate ability to use integrals to calculate.
13. Demonstrate ability to use numerical methods and mathematical software.
14. Demonstrate skills of using trigonometric formulas to solve geometric problems concerning triangles.
15. Demonstrate ability to transform and simplify trigonometric expressions.
16. Demonstrate skills of solving trigonometric equations.
17. Demonstrate skills to represent complex numbers in different ways and to solve simple equations with complex solutions.
18. Demonstrate skills to handle vectors geometrically and algebraically.
19. Demonstrate ability to document, analyze and present solutions to a given problem in a scientific way.

## Innehåll

The course includes the following elements:

- Basic algebra including absolute values, inequalities and rational expressions.
- Sequences and series.
- Polynomials, power functions, rational functions and exponential functions.
- The factor theorem.
- Compound functions and inverse functions.
- Logarithms and logarithmic functions.
- Definition of the derivative.
- Derivatives and differentiation rules for the type of functions mentioned above.
- Applications using the derivative to analyze functions and to solve optimization problems.
- The Riemann sum and the concept of integrals.
- Integral calculus for the functions mentioned above.
- Trigonometric formulas and identities.
- Vectors.
- Introduction to complex numbers.
- Examples of basic numerical methods.
- Mathematical software for visualization, graphing and numerical calculations.

Pathway Mathematics 1 is a course for students who do not meet the level of required mathematics for university studies. The purpose of the course is to support the student's understanding of mathematics at a level needed for studies at university programmes, including content equivalent to the Swedish upper secondary school course Matematik 3c, as well as providing an understanding of important mathematical terminology and concepts in an academic, English-speaking environment. The horizontal aim is to develop and strengthen student skills for participating in higher education, life-long learning and global citizenship through group work, social engagement, peer learning, reflective learning and autonomous learning whilst developing agency, ability to reconcile tensions and dilemmas, intercultural communication skills, metacognitive skills, information literacy and critical thinking.

## Undervisningsformer

Lectures and tutorials.

Undervisningen bedrivs på engelska.

## Förkunskapskrav

High School Diploma and English Language skills corresponding to::

English IELTS 5.0 or the equivalent

Mathematics 2a, 2b, 2c or the equivalent

## Examination och betyg

Kursen bedöms med betygen Underkänd eller Godkänd.

The examination consists of one paper and one written exam. The course is graded pass or fail.

The ILOs are assessed by the following means:

Written exam:

Laboratory report:

Poängregistrering av examinationen för kursen sker enligt följande system:

Examinationsmoment	Omfattning	Betyg
Written exam	6,5 hp	U/G
Laboratory report	1 hp	U/G

## Övrigt

Qualification Requirements

To obtain the Course Certificate the student shall complete the course requirements of 7,5 credits.

Title of qualification

The course gives you skills equivalent to the Swedish upper secondary school course Matematik 3c for eligibility to programmes at Jönköping University.

## Kurslitteratur

Selected parts of: <https://openstax.org/subjects/math>

Additional handouts from JU