UNIVERSITY OF GOTHENBURG

DEPARTMENT OF MATHEMATICAL SCIENCES

MMGK11 Mathematics for Science A1, 15 credits

Naturvetarmatematik A1, 15 högskolepoäng

First Cycle

Confirmation

This course syllabus was confirmed by Department of Mathematical Sciences on 2011-10-13 to be valid from 2011-10-13.

Field of education: Science 100%
Department: Department of Mathematical Sciences

Position in the educational system

The course is given in the Chemistry program and the Medicinal chemistry program. It can also be studied as a freestanding course.
The course may not be included as part of the requirement of courses in the main field of study mathematics according to the course requirements for a Degree of Bachelor in mathematics.

The course can be part of the following programmes: 1) Bachelor of Science Programme in Medicinal Chemistry (N1LMK) and 2) Bachelor of Science Programme in Chemistry (N1KEM)

Main field of studies	*Specialization*
Mathematics	G1N, First Cycle, has only upper-secondary level entry requirements

Entry requirements

Learning outcomes

On successful completion of the course the student will be able to:

Knowledge and understanding

Competence and skills

- handle algebraic expressions with skill
- solve simple polynomial equations and trigonometric equations
- differentiate compositions of functions by means of the chain rule
- calculate simple integrals
- solve linear equation systems with Gauss elimination
- handle lines and planes in three dimensions

Judgement and approach

Course content

Part 1:

Algebra - simplification of algebraic expressions by means of the square rule etc, completing the square, factorisation of polynomials of degree two, absolute values, inequalities, roots, powers, logarithms.

Trigonometry - angle measurement (degrees, radians), Pythagoras' theorem, sine, cosine, tangent in right-angled triangle, values for special angles, periodicity and graph for the sine, cosine and tangent, general solution of equations of type "cos v = a", simple trigonometric formulae.

Limits - number sequences, recursive definition, limits for number sequences and functions, standard limits and left and right limits.

Solution of linear equation systems with Gauss elimination. Vector operations in two and three dimensions. Inner product and vector product. Equations for lines and planes. Curves in space with tangents.

Part 2:

Derivatives - rules of differentiation, standard derivatives, the chain rule.

Integrals - primitive functions, the interpretation of the integral as an area, something of the Riemann integral, the relationship between derivatives and integrals, something of the fundamental theorem of calculus, the chain rule backwards, something of substitution of variables, integration by parts, something of Taylor's formula.

Ordinary Differential Equations - the integral as solution to a differential equation, more general (ordinary) differential equations, something of first order linear differential equations and separable differential equations.

Form of teaching

Language of instruction: Swedish

Assessment

There is a written examination at the end of each module.

During the course, there may be optional assignments that give bonus points on the exam. Information about such components been given before start of the course via the webpage for the current course instance.

The student has the right to request a change of examiner if they have failed twice on the same examination, if this is practically possible. A request for change of examiner should be written and sent to the department.

Grades

The grading scale comprises: Fail (U), Pass (G), Pass with Distinction (VG).
To obtain the grade Pass on the whole course, Pass is required on each module. To obtain the grade Pass with distinction on the whole course, the mean of the points on the exams of the modules should furthermore correspond to the requirement for Pass with distinction on the modules.

Course evaluation

Course evaluation is made by means of questionnaire(s) in GUL and conversations with student representatives.