Department of Mathematics (incl. Math. Statistics)

Stockholm University

Syllabus

for course at first level

Mathematics for the Natural Sciences I

Matematik för naturvetenskaper I

15.0 Higher Education Credits

15.0 ECTS credits

Course code:	MM2002
Valid from:	Autumn 2014
Date of approval:	2014-10-02
Department	Department of Mathematics (incl. Math. Statistics)
Main field:	Mathematics/Applied Mathematics
Specialisation:	G1N - First cycle, has only upper-secondary level entry requirements

Decision

This syllabus has been approved by the Board of Faculty of Science at Stockholm University 2014-10-02.

Prerequisites and special admittance requirements

Swedish upper secondary school courses Physics B, Chemistry B and Mathematics D, or equivalent.

Course structure

Examination code	Name	Higher Education Credits
N101	Basic Computational Skills	1.5
N102	Polynomials	1.5
N103	Matrices and Systems of Linear Equations	1.5
N104	Elementary Functions	1.5
N105	Differentiation	1.5
N106	Integration	1.5
N107	Mathematics for natural sciences I - theory	6

Course content

a. The course covers computation with real and complex numbers, vectors, bases, coordinates, scalar product, vector product, trigonometric functions, exponential and logarithmic functions, inverses and arcus functions, polynomials: division and the factor theorem, rational functions and partial fractions, limits of functions, derivatives: rules of computation and applications, tangent and normal, basic drawing of plots and curves in the plane, derivatives in multiple variables, gradient and directional derivative, max and min problems, linear systems of equations and Gaussian elimination, matrices, matrix inverse, determinants, linear dependence, change of basis, eigenvalues and eigenvectors, primtive functions, area and the fundamental theorem of calculus, applications on volume, arc length, line integrals, first- and second-order differential equations.

b. The course consists of the following parts:
1. Algebra, Basic Computational Skills, 1.5 ECTS credits, N101
2. Algebra, Polynomials, 1.5 ECTS credits, N102
3. Algebra, Matrices and Systems of Linear Equations, 1.5 ECTS credits, N103
4. Mathematical analysis, Elementary Functions, 1.5 ECTS credits, N104
5. Mathematical analysis, Derivation, 1.5 ECTS credits, N105
6. Mathematical analysis, Integration, 1.5 ECTS credits, N106
7. Problem Solving, 1.5 ECTS credits, N107

Learning outcomes

Upon completion of the course, the student is expected to be able to:
* show good computational skills in elementary algebra and in working with functions
* use standard methods in mathematical analysis to solve problems in mathematics and in applications.
* use standard methods in linear algebra to solve problems in mathematics and in applications.

Education

Instruction is given in the form of lectures and exercise sessions.

Forms of examination

a. The course is examined by a written exam.

b. Grading is carried out according to a 7-point scale related to the learning objectives of the course:

A = Excellent
B = Very Good
C = Good
D = Satisfactory
E = Sufficient
Fx = Insufficient
F = Completely insufficient

Grading of part 1-6 is carried out according to a 3-point scale: pass with distinction (VG), pass (G) or fail (U).

c. Grading criteria for the course will be distributed at the start of the course.

d. Grade at least E and at least a pass grade on moments 1-6 is required to pass the course.

e. Students who fail an ordinary examination are entitled to take additional examinations as long as the course is offered. There is no restriction on the number of examinations. The term "examination" here is used to denominate also other compulsory elements of the course. Students who have achieved a pass grade on an examination may not retake this examination in order to attempt to achieve a higher grade. Students who have failed to reach a pass grade on two occasions have the right to request that a different teacher be appointed to grade the next exam. A request for such appointment must be sent to the departmental board.
The course has at least two examinations for each academic year in the years in which instruction is provided. Intervening years include at least one examination.

f. An opportunity to make up from grade Fx to a pass grade is not given for this course.

Interim

Students may request that the examination is carried out in accordance with this syllabus even after it has ceased to apply. This right is limited, however, to a maximum of three occasions within a two-year-period after the end of the course offering. A request for such examination must be sent to the departmental board. This provision is also valid in the case of revision of the syllabus.

Limitations

The course may not be included in a degree together with the course Mathematics for the Natural Sciences (MM1001) 15 ECTS credits, Mathematics for chemists (MA8720) 15 ECTS credits, Mathematics I (MM2001) 30 ECTS credits, Mathematics for the Social Sciences (MM1002) 15 ECTS credits, Mathematics for the Natural Sciences (MM1007) 15 ECTS credits, Mathematical Methods for Economists (MM3001) 7.5 ECTS credits, Introductory Course in Mathematics (MM1003) 7.5 ECTS credits, or the equivalent.

Misc

The course can be taken within Bachelor programs in the natural sciences. It can also be takes as an individual course.

Required reading

Course literature is decided by the departmental board and is thereafter published as an appendix to the course plan.