Syllabus

for course at first level

Mathematics for the Natural Sciences II
Matematik för naturvetenskaper II

15.0 Higher Education Credits
15.0 ECTS credits

Course code:	MM4001
Valid from:	Autumn 2014
Date of approval:	2014-08-22
Department	Department of Mathematics (incl. Math. Statistics)

Main field:	Mathematics/Applied Mathematics
Specialisation:	G1F - First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Decision

This syllabus has been approved by the Board of the Faculty of Science at Stockholm University 2014-08-22.

Prerequisites and special admittance requirements

To qualify for the course knowledge equivalent to Mathematics for the Natural Sciences I (MM2002) is required.

Course structure

Examination code	Name	Higher Education Credits
N201	Seminar in Problem Solving	3
N202	Computer-aided Problem Solving	3
N203	Mathematics for natural sciences II - theory	9

Course content

a. The course treats equations with absolute values and inequalities, limits of sequences of numbers and functions, properties of continuous and differentiable functions, asymptotics and advanced sketches of graphs, definition of integral and the fundamental theorem of calculus, series and generalized integrals, Taylor polynomials and applications, prime numbers and modulo calculus, the Euclidean algorithm, logic and set theory, induction, combinatorics and the binomial theorem, lines and planes, linear maps and their matrices, double integrals and volume, variable substitution in double integrals, differential calculus in two variables, partial differential equations, curves and surfaces of the second degree.

b. The course consists of the following parts:
1. Seminar in problem solving 3 ECTS credits, N201
2. Computer aided problem solving 3 ECTS credits, N202
3. Problem solving 9 ECTS credits, N203

Learning outcomes

It is expected that the student after taking the course will be able to:
• define the basic concepts in mathematical analysis in one and several variables and deduce their simplest properties,
• use methods in mathematical analysis in one variable and solve applied problems
• define basic concepts in linear algebra in two and three dimensions and account for their simplest

properties
• use methods of linear algebra to solve mathematical and applied problems
• solve simple problems in analysis in several variables
• use mathematical software to solve problems in mathematical analysis and linear algebra
• give oral and written accounts of solutions of simple problems in algebra and analysis in a logically coherent manner

Education

Instruction is given in the form of lectures, group tutoring, exercise sessions, student presentations and computer labs.

Participation in group work is mandatory. If there are special reasons, the examiner may, after consultation with the relevant teacher, allow the student exemption from the obligation to participate in group work.

Forms of examination

a. Examination for the course is in the following manner: knowledge assesment of part 1 is by hand in assignments and oral presentations. Knowledge assesment of part 2 is by labs and a written exam. Knowledge assesment of part 3 is by written exam.

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

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

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

d. A minimum grade of E and passing grades on parts N201 and N202 are 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 set the grade of the course. 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. There is no possibility to improve the grade Fx to a pass grade in 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 during a two-year-period after the end of giving the course. 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 courses Mathematics I (MM2001) 30 ECTS credits, Preparatory course in mathematics (MM1003) 7,5 ECTS credits, or similar.

Misc

The course is a component of the Bachelor programs in astronomy, physics, meteorology, oceanography and medical physics and it can also be taken as an individual course. The courses Mathematics for the Natural Sciences I 15 ECTS credits (MM2002) and Mathematics for the Natural Sciences II 15 ECTS credits correspond to the course Mathematics I 30 ECTS credits (MM2001).

Required reading

Course literature is decided by the departmental board and is described in an appendix to the syllabus.