Syllabus

for course at advanced level

Linear Algebra with Applications
Linjär algebra med tillämpningar

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	MM7013
Valid from:	Spring 2009
Date of approval:	2009-03-02
Department	Department of Mathematics (incl. Math. Statistics)
Subject	Mathematics/Applied Mathematics

Decision

This syllabus was approved by the Board of the Faculty of Science at Stockholm University on 2 March 2009.

Prerequisites and special admittance requirements

Admission to the course requires knowledge equivalent to 60 credits in mathematics, where Linear algebra II, 7.5 credits (MM5004) and Mathematical analysis III, 7.5 credits (MM5001) or equivalent, are included. Also required is knowledge equivalent to Swedish upper secondary course English B.

Course structure

Examination code	Name	Higher Education Credits
F713	Linear Algebra with Applications	7.5

Course content

The course covers:
Least-square method, invariant subspaces, Hankel operators, Bezoutians, continued fractions and orthogonal polynomials, Cauchy index. In addition, some of the following topics will be selected: Stability, systems and their representations, realization theory, stabilization, Hankel norm approximation including Schmidt pairs of Hankel operators, duality, Nevanlinna-Pick interpolation, Hankel approximant, singular values.

Learning outcomes

After the course, students are expected to be able to:
• account for the theory of the central notions in applied linear algebra
• account for the mathematical theory behind different methods in applied linear algebra
• explain and use methods of applied linear algebra to solve problems in the natural and social sciences.

Education

Instruction consists of seminars and/or exercises and tutoring. There may be compulsory home assignments.

In the event of special circumstances, the examiner may, after consultation with the teacher concerned, grant a student exemption from the obligation to participate in certain compulsory instruction.

Forms of examination

a. The course is examined as follows: Knowledge assessment takes the form of written and/or oral examination.

b. Grades are assigned according to a seven-point goal-related grading scale:

A = Excellent
B = Very good
C = Good
D = Satisfactory
E = Sufficient
Fx = Fail (more work required before credit can be awarded)
F = Total fail

c. The grading criteria will be distributed at the beginning of the course.

d. To be awarded a pass, the minimum grade E is required together with participation in all compulsory education, and, the case being, approved home assignments.

e. Students who fail an ordinary examination are entitled to sit additional examinations as long as the course is offered. There is no restriction on the number of examinations. Examinations also include other obligatory elements of the course. Students who have passed an examination may not resit it in order to achieve a higher grade. Students who have failed on two occasions are entitled to request the appointment of a different examiner for the next examination. Any such request must be made to the departmental board.

Interim
Students may request that the examination be conducted in accordance with this course plan even after it has ceased to be valid. However, this may not take place more than three times over a two year period after course instruction has ended. Requests must be made to the departmental board.

Misc
The course is a component of the Master's programme in applied mathematics, but it can also be taken as an individual course.

Required reading
Course literature is decided by the departmental board and described thereafter in an appendix to the course plan.