

Syllabus

for course at advanced level

Mathematical Control Theory
Matematisk kontrollteori

7.5 Higher Education
Credits
7.5 ECTS credits

Course code:	MM8016
Valid from:	Spring 2009
Date of approval:	2009-03-02
Department	Department of Mathematics (incl. Math. Statistics)
Subject	Mathematics
Specialisation:	AXX - Second cycle, in-depth level of the course cannot be classified

Decision

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

Prerequisites and special admittance requirements

To qualify for the course knowledge equivalent to 90 credits in Mathematics is required, where Foundations of analysis, 7.5 credits, Analytic functions I 7.5 credits, Ordinary differential equations 7.5 credits and Dynamic systems and optimal control theory 7.5 credits are included.

Also required is knowledge equivalent to Swedish upper secondary course English B or equivalent to one of the following tests; Cambridge CPE and CAE: Pass, IELTS: 6.0 (with no part of the test below 5.0), TOEFL (paper based): 550 (with minimum grade 4 on the written test part), TOEFL (computer based): 213, TOEFL (internet based): 79.

Course structure

Examination code	Name	Higher Education Credits
F816	Mathematical Control Theory	7.5

Course content

The focuses of the course lie on deterministic finite dimensional systems with emphasis on a systematic treatment of the core of control theory: the algebraic theory of linear systems including controllability, observability, feedback equivalence and minimality; stability via Lyapunov as well as input/output methods; ideas of optimal control; observer and dynamics feedback, parametrization of stabilizing controllers; and some very basic facts about frequency domain such as the Nyquist criterion.

Learning outcomes

It is expected that the student after taking the course will be able to:

- account for the central notions in mathematical control theory
- account for the mathematical theory behind different methods in mathematical control theory
- use methods in mathematical control theory to solve applied problems in the natural and social sciences.

Education

The education consists of seminars and/or exercises and supervision of group work. There may be obligatory submitted work.

Forms of examination

a. Examination for the course is in the following manner: measurement of knowledge takes place through written and/or oral examination.

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 = Fail

F = Fail

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

d. A minimum grade of E is required to pass the course and participation in all obligatory education, and, the case being, approved submitted work.

e. Students who fail to achieve a pass grade in an ordinary examination have the right to take at least further four examinations, as long as the course is given. The term “examination” here is used to denote 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

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.

Misc

The course is a component of the Master program in applied mathematics, and it can also be taken as an individual course.

Required reading

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