Department of Mathematics (incl. Math. Statistics)

Stockholm University

Syllabus
for course at advanced level

Fourier Analysis
Fourieranalys

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	MM8003
Valid from:	Autumn 2007
Date of approval:	2006-09-27
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 was approved by the Board of the Faculty of Science at Stockholm University on 27 September 2006.

Prerequisites and special admittance requirements

Admission to the course requires knowledge equivalent to 90 credits in mathematics, where Linear Analysis, 7.5 credits, The Foundations of Analysis, 7.5 credits, and Analytical Functions I, 7.5 credits, or equivalent, are included. English B/English 6 or equivalent.

Course structure

Examination code	Name	Higher Education Credits
F803	Fourier analysis	7.5

Course content

The course covers: Basic theory for Fourier series and Fourier integrals in L1 and L2. The connection between Fourier integrals and analytic functions (Paley-Wiener theorems, Hardy functions). Applications in various fields, for example heat propagation, isoperimetric inequality, equal distribution modulo 1, random walk, band- and timelimited signals, filters, Wiener-Hopf factorization.

Learning outcomes

After the course, students are expected to be able to:
* account for and prove further theorems on Fourier series and Fourier integrals than are dealt with in the course Linear Analysis
* use methods in Fourier analysis to prove theoretical and applied problems.

Education

Instruction consists of lectures and exercises.

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.

e. Students who fail an ordinary examination are entitled to take at least further four examinations, as long as the course is given. 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 that a different teacher be appointed to set the grade of the course. 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. The provision also applies in the case of revisions to the course plan.

Limitations

The course may not be included in a degree together with the course Fourier Analysis, specialized course (MA4160).

Misc

The course is a component of the Master's Programmes in Mathematics and 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.