



## DEPARTMENT OF MATHEMATICAL SCIENCES

### **MMA130 Theory of Distributions, 7.5 credits**

Distributionsteori, 7,5 högskolepoäng

*Second Cycle*

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#### **Confirmation**

This course syllabus was confirmed by Department of Mathematical Sciences on 2018-03-09 to be valid from 2018-03-09, spring semester of 2018.

*Field of education:* Science 100%

*Department:* Department of Mathematical Sciences

#### **Position in the educational system**

The course can be part of the following programme: 1) Mathematical Sciences, Master's Programme (N2MAT)

*Main field of studies*

Mathematics

*Specialization*

A1F, Second cycle, has second-cycle course/s as entry requirements

#### **Entry requirements**

General entry requirements and the equivalent of the courses *MMA110 Integration Theory*.

#### **Learning outcomes**

On successful completion of the course the student will be able to:

- define the distributional derivative and compute basic such derivatives,
- explain what it means for distributions to converge and compute simple limits,
- solve differential equations and answer basic regularity questions using fundamental solutions,
- find fundamental solutions of simple differential operators,
- solve simple equations involving distributions,

- compute the Fourier transform of basic tempered distributions.

**Course content**

In this course the student will be introduced to the theory of distributions, learn basic properties and operations on distributions, and apply the general theory to concrete problems, in particular involving differential operators.

Course content: Test functions. Derivatives, support, and convolution of distributions. Differential operators and fundamental solutions. Tempered distributions and the Fourier transform. The Paley-Wiener theorem. The Fourier transform on  $L^2$ .

**Form of teaching**

*Language of instruction:* English

**Assessment**

The examination consists of written assignments, and an oral and written exam. During the course, there may be optional assignments that give bonus points on the exam. Examples of such assignments are small written tests, labs, and oral or written presentations. Information about this is found on the course home page.

If a student, who has failed the same examined component twice, wishes to change examiner before the next examination, a written application shall be sent to the department responsible for the course and shall be granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

**Grades**

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

**Course evaluation**

The course is evaluated with an anonymous questionnaire and/or a discussion with the student representatives. The results of and possible changes to the course will be shared with students who participated in the evaluation and students who are starting the course.

**Additional information**

For a list of course literature, see:

<https://www.chalmers.se/sv/institutioner/math/utbildning/grundutbildning-goteborgs-universitet/kurslitteratur/Sidor/Kurslitteratur-i-matematik.aspx>

The syllabus for MMA130 was originally established to take effect from 2007-07-01, when it replaced MAF610.