UNIVERSITY OF GOTHENBURG

DEPARTMENT OF MATHEMATICAL SCIENCES

MMA110 Integration Theory, 7.5 credits

Integrationsteori, 7,5 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by Department of Mathematical Sciences on 2018-03-12 to be valid from 2018-07-01, autumn 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	*Specialization*
Mathematics	A1N, Second cycle, has only first-cycle course/s as entry requirements

Entry requirements

General entry requirements and the equivalent of 90 credits in mathematics.

Learning outcomes

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

- define sigma-algebras and motivate their use,
- construct a measure by using Caratheodory's theorem,
- define a function up to a null-set, decide if a function is measurable/integrable with respect to an arbitrary given measure, and in this case find its integral,
- apply Lebesgue’s theorem on dominated convergence and know restrictions on its use,
- handle signed measures and give the Lebegues-Radon-Nikodym decomposition of one measure with respect to another,

- define Lebesgue differentiation, and apply
  it to differentiation of functions of bounded variation.

Course content

The course gives the basics of measure theory and
integration theory. This includes measures and integration on abstract measure spaces as well as the construction of Lebesgue-Stieltjes
measures on Euclidean space. Among the most important theorems covered are: Lebesgue's theorem on dominated convergence, Fubini's theorem, the Lebegues-Radon-Nikodym theorem, the Hardy-Littlewood maximal theorem, Lebesgue's theorem on differentiation of integrals and the properties of functions of bounded variation.

Form of teaching

Language of instruction: English

Assessment

There will be an oral or written examination at the end of the course. 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 MMA110 was originally established to take effect from 2007-07-01, when it replaced MAF440, and was revised 2007-10-01.