Advanced Basics of Geometric Measure Theory, 7.5 hp

Course period:
January 18 - March 11, 2016

Last day for application:
January 18, 2016

Course leader / Address for applications:
Maria Roginskaya / maria@chalmers.se

Course description (Advertisement for Ph.D. students):
The idea that not all sets are measurable was a groundbreaking step in the Analysis of the 20th century, and the study of classes of sets which can be measurable and how to find such sets has wide-ranging implications for both Analysis, Probability and Information Theory. We will briefly address some basics of this theory in the first part of the course.

In the transition from the 20th to the 21st century, much interest has arisen in fractal sets, which arise in many applications both inside and outside mathematics. A natural tool to study such sets is Hausdorff measures and in the second part of the course we will define and briefly study them.

We will meet twice a week for two hours during Lp3.

Responsible department and other participation departments/organisations:
Mathematics Department

Teacher:
Maria Roginskaya

Examiner:
Maria Roginskaya

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1. Confirmation
The syllabus was confirmed by the Head of the Department of XXX 200X-XX-XX, 200X-XX-XX.

Disciplinary domain: Science
Department in charge: Department of Mathematical Sciences
Main field of study: Mathematics

2. Position in the educational system
Elective course; third-cycle education

3. Entry requirements
Nothing more than general acquaintance with mathematical proofs and knowledge of the epsilon-delta language.

4. Course content
The course contains some general fundamentals and basics of Descriptive Set Theory, introduces Hausdorff measures, and studies some of their properties including an example by Körner of sets exhibiting arbitrary growth for the dimensions of its sumsets.

5. Outcomes

After completion of the course the Ph.D. student is expected to be able to:

- Understand measurability and basic properties of Hausdorff measures
- Evaluate Hausdorff measure/dimension in some examples arising in applications.

6. Required reading
Maria Roginskaya. Advanced Basics of Geometric Measure theory (the book can be loaned for the duration of the course) + written notes.

7. Assessment
At the end of the course there will be an oral exam.

A Ph.D. student who has failed a test twice has the right to change examiners, if it is possible. A written application should be sent to the Department.

In cases where a course has been discontinued or major changes have been made a Ph.D. should be guaranteed at least three examination occasions (including the ordinary examination occasion) during a time of at least one year from the last time the course was given.

8. Grading scale
The grading scale comprises Fail, (U), Pass (G)

9. Course Evaluation
The course evaluation is carried out together with the Ph.D. students at the end of the course, and is followed by an individual, anonymous survey. The results and possible changes in the course will be shared with the students who participated in the evaluation and to those who are beginning the course.

10. Language of instruction
The language of instruction is English.