

Descriptive Set Theory 1, 7.5 hp

Course period:

August 28 - October 29, 2016

Last day for application:

August 28, 2016

Course leader / Address for applications:

Maria Roginskaya / maria@chalmers.se

Course description (Advertisement for Ph.D. students):

Descriptive Set Theory is a field has its origin in both Topology and Analysis, and its application range from Functional Analysis and Operator Algebras to Logic. The course is aimed to show the basic techniques and objects of the Descriptive Set Theory and does not assume previous knowledge of the Set Theory or Topology above that which is commonly met in Master level analysis courses (i.e. notion of metric and open/closed set). We will start from discussing Axiom of Choice, introduce such technical tools as ordinals, trees, schemes and games. We will work mainly with Polish spaces, and discuss the multiple examples of those. The main subject of the course are Baire categories, Borel hierarchy of sets, analytic and co-analytic sets and their relation with continuous functions.

The course will start in last days of August and meet three times a week (3 by 2 hours) until the end of October (LP1). Two of the meetings each week will be lectures and one a discussion session. The schedule will be decided by participants at an introductory meeting.

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 Mathematical Sciences 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

Real Analysis, Functional Analysis is recommended

4. Course content

The course will cover the following topics. The final curriculum will be decided upon during the course.

- Axiom of Choice, ordinals and cardinals;
- Examples of Polish spaces including Polish groups and Fell spaces;
- Baire categories;
- Borel sets, Borel hierarchy;
- Uniformization and Partition theorems;
- Infinite games and Borel determinacy.

5. Outcomes

At the end of the course, the students will have acquired knowledge about some of the main results and techniques of Descriptive Set Theory.

6. Required reading

We will go through the first half of *Classical Descriptive Set Theory* by A.S.Kechris.

7. Assessment

There will be 7 discussion sessions with obligatory participation in at least 4 and an oral exam at the end of the course

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.