LUND UNIVERSITY
Faculty of Science

Syllabus for the course Percolation Theory and Random Graphs, NAMS005

Swedish title: Perkolationsteori och slumpgrafer

The course syllabus was confirmed by the Faculty board for graduate studies 22 February 2017. The course is in the third cycle and amounts to 7.5 credits.
The course syllabus is formally approved in Swedish. This is a translation.

Learning outcomes
On completion of the course, participants shall be able to:

Knowledge and understanding
- Describe different theoretical principles and methods to solve problems in the area of rand graphs and outline their proofs
- Describe applications of random walks such as in physics and computer sciences.

Skills and abilities
- Propose and use an appropriate method to resolve a given question about random graphs.

Judgement and approach
- Reflect on strengths and limitations of various probabilistic methods.

Course content
Definitions of random graphs and their properties. Percolation models in several dimensions. The critical value and infinite clusters. Erdos-Rényi graphs. Methods: branching processes, coupling, etc. Applications to various mathematical problems arising in natural sciences as well as sociology.

Teaching
Teaching consists of lectures, seminars and / or self-studies.

Assessment
Examination isbased on an oral exam

Grading scale
Possible grades are Pass and Fail. To pass the course, the student must pass the oral exam.

Language of instruction
English.

Entry requirements
MASC01 ”Probability theory” or equivalent.