SF2740 Graph Theory 7.5 credits

Grafteori

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for SF2740 valid from Autumn 2015

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

SF1631 Discrete mathematics or corresponding knowledge.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The aim of the course is to understand and be able to use basic theory and methods from the theory of graphs. The course can both be seen as a step stone to more advanced studies in mathematics and to be able to apply graph theory in applications in neighboring disciplines. After the student has finished the course he/she is expected to

- know the basic definitions and concepts of Graph theory.
- be able to formulate problems in graph theoretic terms.
- have increased ability in graph theoretic problem solving.
- understand various versions of connectedness of a graph, understand structural theorems and be able to describe and use the theorems of Mader and Menger.
- Understand and be able to use the concept of a minor.
- Know about many different coloring problems for graphs. Be able to formulate applied problems as coloring problems.
- Understand and be able to use different models of random graphs and (random networks).
- Be able to do basic usage of the probabilistic method in graph theory.

Course contents

Basic concepts of graph theory: degree, distance, diameter, matching etc. Theory for matchings, in particular for bipartite graphs. Structure theorems about 2- and 3- connected components of graphs, also Mader's and Menger's Theorems. Theory about minors, planarity. Coloring of various kinds, Perfect graphs, Hadwiger's conjecture, random graphs and the probabilistic method.

Examination

- TEN1 - Examination, 7.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

Continuous examination with assignments and presentation of project.

Ethical approach

- All members of a group are responsible for the group's work.

- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.