

Discrete Mathematics II — Winter 2011/12

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Time: Lectures: Tuesdays, Wednesdays 8:30-10:00,

Exercises: Tuesdays 12:30-14:00.

Course webpage: <http://discretemath.imp.fu-berlin.de/DMII-2011-12/>

Topics of the course

- Graph Theory (matchings, colorings, planarity, Hamiltonicity),
- Extremal Combinatorics (set systems, forbidden substructures, Regularity Lemma, Ramsey-theory, Roth's Theorem)
- Methods of combinatorics (probabilistic, linear algebraic, algorithmic, topological)

Prerequisite: basic graph theory, combinatorics, algebra, and calculus

Requirement for "active participation at the exercises". There will be 12 sheets of exercises. You should try to solve and write up all exercises for yourself, because you will face some of them on the final exam. Each week submit solutions for two exercises, those you would want to be corrected. For the signature on the exercises you must achieve 60% of the total score (for each exercise the same score will be given).

You will usually have two weeks to think about each sheet, except the first one. The new exercise sheet will normally be placed on the web shortly after the end of the Wednesday lecture. You should submit your solutions until the end of the appropriate Tuesday lecture. It is not possible to submit the solutions later.

It would be great if you thought about and discussed the exercises in small groups. You are encouraged to submit your solutions in pairs. At the beginning of each solution note the name of the person who wrote it up; every student must write up at least five times (out of the twelve).

Furthermore, each student must present at least once a correct solution at the board.

In conclusion, for the exercise session credit you need to fulfil each of the following:

- achieving at least 60% of the point value of $2 \times 12 = 24$ homework problems,
- writing up the solutions yourself at least five times (besides writing the name of the two authors, on each solution you should state who the scribe was),
- presenting at least once a correct solution at the board.

Final. The grade for the course is based solely on the final exam,. The final takes place on February 21st from 10AM to 12PM. The make-up final exam will be on the 28th of March from 10AM to 12PM.

There will be three different type of exercises at the final:

- Definitions, statement and proofs of theorems.
You should know all the material presented at the lecture.
- Problems from the exercise sheets.
You should know how to solve all homework exercises.
- New problems
You should be able to apply the encountered theorems and methods to solve exercises you have possibly never seen.

Literature. There will be no lecture notes. The material is taken from the following books, which are placed on the Handapparat in the mathematics library:

- N. Alon, J. Spencer: The Probabilistic Method
- R. Diestel, Graph Theory (both German and English editions).
- S. Jukna, Extremal Combinatorics
- J. van Lint, R. Wilson, A course in Combinatorics
- D. West: Introduction to Graph Theory

Further reading.

- B. Bollobás, Combinatorics
- L. Lovász, Combinatorial Problems and Exercises