Department of mathematics
KTH

Program for the course Discrete Mathematics, SF2736 fall 2014.

Teacher and examiner:

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Textbook: N.L. Biggs: Discrete Mathematics (Second edition).

Syllabus: See the plan for the lectures on the next page.

Examination: A written exam takes place on January 14, 2015, at 14.00 to 19.00. The exam consists of ten problems divided into three parts. Part I consists of five simple problems, Part II consists of three more complex problems. Part III consists of two problems, that are more challenging than those of Part I and Part II. To pass the exam it is sufficient to solve the first five problems, but to get the highest grade it is necessary to also solve at least one of the problems of Part III, and all problems of Part I and Part II. The grades are A, B, C, D, E and F. The grade Fx gives a possibility to make a supplementary exam, shortly after the original exam, in order to get the grade E.

Homework: There will be five voluntary homeworks that can to be delivered to the examiner at certain terms. Each correct homework will give one bonus point at the final exam and added to the points of part I in the exam.

Schedule for the lectures

Date		Content	Chapter
3/11	1	A Diophantine equation and prime number factorizations	8
5/11	2	The fundamental theorem of arithmetics, modular arithmetic	8, 13.1
6/11	3	The ring Z_n and the theorems of Euler and Fermat	13.2-13.3
6/11	4	An application: Chinese remainder theorem	
10/11	5	Problem session	
11/11	6	An application: RSA cryptology	
12/11	7	Relations, equivalence relations and partial orders	7.2
14/11	8	Functions, the pigeon hole principle, cardinality of infinite sets	5, 6
17/11	9	Problem session	
18/11	10	Combinatorics, binomial and multinomial coefficients	10.1-10.5
19/11	11	Stirling numbers, the principle of inclusion and exclusion	11.1-11.4, 12.1-12.3
20/11	12	Moebius inversion formula	11.5
24/11	13	Problem session	
26/11	14	Groups, elementary facts and examples	20.1-20.4
27/11	15	Subgroups, cosets and the theorem of Lagrange	20.5-20.8
28/11	16	Permutations	10.6, 12.4-12.6
1/11	17	Problem session	
3/12	18	The lemma of Burnside and counting	21.1-21.4
4/12	19	Error correcting codes	24.1-24.4
5/12	20	Generating functions and combinatorics	25.4, 26.1-26.5
8/12	21	Problem session	
9/12	22	Graphs, Eulerian and Hamiltonian graphs, colorings	15.1-15.7
10/12	23	Planar graphs	
12/12	24	Bipartite graphs and matchings	17.1-17.6
15/12	25	The max-flow min-cut theorem	18.1-18.4
18/12	26	Problem session	
19/12	27	Revision	
14/01		Exam 14.00-19.00	