Department of mathematics
KTH

Program for the course Discrete Mathematics, SF2736 fall 2013.

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 examination will take place on January 17 at 08.00 to 13.00. The examination consists of ten problems divided into three parts. Part I consists of five problems, Part II consists of three problems. Part III consists of two problems that are of more complex nature 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 further solve at least one of the problems of Part III, and all problems of Part II. The grades will be A, B, C, D and E for passing. Furthermore, Fx will imply 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 have to be delivered by the students 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

Day		Content	Chapter
4/11	1	A Diophantine equation and prime number factorizations	8
6/11	2	The fundamental theorem of arithmetics, modular arithmetic	8, 13.1
7/11	3	The ring Z_n and the theorems of Euler and Fermat	13.2-13.3
8/11	4	Some applications: RSA and fast aritmetiques	
11/11	5	Problem session	
13/11	6	Relations, equivalence relations and partial orders	7.2
14/11	7	Functions, the pigeon hole principle, cardinality of infinite sets	5, 6
15/11	8	Problem session	
18/11	9	Combinatorics, multinomial coefficients	10.1-10.2, 10.4-10.5
19/11	10	The binomial theorem, partitions and Stirling numbers	11.1-11.3, 12.1-12.3
20/11	11	The principle on inclusion exclusion, Möbius inversion	10.3, 11.4-11.5
25/11	12	Problem session	
27/11	13	Groups, elementary facts and examples	20.1-20.4
28/11	14	Subgroups, cosets and the theorem of Lagrange	20.5-20.8
29/11	15	Permutations	10.6, 12.4-12.6
2/12	16	Problem session	
4/12	17	The lemma of Burnside and counting	21.1-21.4
5/12	18	Error correcting codes	24.1-24.4
6/12	19	Generating functions and partition of positive integers	25.4, 26.1-26.5
9/12	20	Problem session	
10/12	21	Graphs, Eulerian and Hamiltonian graphs, colorings	15.1-15.7
11/12	22	Planar graphs	
13/12	23	Bipartite graphs and matchings	17.1-17.6
16/12	24	The max-flow min-cut theorem	18.1-18.4
18/12	25	Problem session	
19/12	26	Revision	
20/12	27	Lecture in reserve, or revision	
17/01		Exam 08.00-13.00	