Department of mathematics
KTH

Program for the course Discrete Mathematics, SF2736 fall 2012.

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 December 14 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
24/10	1	A Diophantine equation and prime number factorizations	8
25/10	2	The fundamental theorem of arithmetics, modular arithmetic	8, 13.1
26/10	3	The ring Z_n and the theorems of Euler and Fermat	13.2-13.3
29/10	4	Some applications: RSA and Chinese reminder theorem	
30/10	5	Problem session.	
1/11	6	Relations, equivalence relations and partial orders	7.2
2/11	7	Functions, the pigeon hole principle, cardinality of infinite sets	5, 6
6/11	8	Problem session	
7/11	9	Combinatorics, multinomial coefficients	10.1-10.2, 10.4-10.5
8/11	10	The binomial theorem	11.1-11.3
9/11	11	Inclusion-exclusion, the Moebius inversion formula	10.3, 11.4-11.5
13/11	12	Partitions and Stirling numbers	12.1-12.3
14/11	13	Problem session	
15/11	14	Groups, elementary facts and examples	20.1-20.4
16/11	15	Subgroups, cosets and the theorem of Lagrange	20.5-20.8
19/11	16	Permutations	10.6, 12.4-12.6
20/11	17	Problem session	
22/11	18	The lemma of Burnside and counting	21.1-21.4
23/11	19	Error correcting codes	24.1-24.4
26/11	20	Generating functions and partition of positive integers	25.4, 26.1-26.5
27/11	21	Problem session	
28/11	22	Graphs, Eulerian and Hamiltonian graphs, colorings	15.1-15.7
30/11	23	Planar graphs	
3/12	24	Bipartite graphs and matchings	17.1-17.6
5/12	25	The max-flow min-cut theorem	18.1-18.4
6/12	26	Problem session	
7/12	27	Repetition	
14/12		Exam 08.00-13.00	