Program for the course Discrete Mathematics, SF2736, at KTH, fall 2011.

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 19 at 14.00 to 19.00. 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, and further 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
26/10	1	A Diophantic equation and prime number factorizations	8
27/10	2	Fundamental theorem of arithmetics, modular arithmetic	8, 13.1
28/10	3	Z_n and the theorems of Euler and Fermat	13.2-13.3
31/10	4	Some applications: RSA and Chinese reminder theorem	
1/11	5	Problem session.	
3/11	6	Relations, equivalence relations and partial orders	7.2
4/11	7	Functions, pigeon hole principle, cardinality of infinite sets	5, 6
7/11	8	Problem session	
8/11	9	Combinatorics, multinomial coefficients	10.1-10.2, 10.4-10.5
10/11	10	Binomial theorem	11.1-11.3
11/11	11	Principle on inclusion exclusion, Moebius inversion formula	10.3, 11.4-11.5
15/11	12	Partitions and Stirling numbers	12.1-12.3
16/11	13	Problem session	
17/11	14	Groups, elementary facts and examples	20.1-20.4
18/11	15	Subgroups, cosets and the theorem of Lagrange	20.5-20.8
21/11	16	Permutations	10.6, 12.4-12.6
22/11	17	Problem session	
24/11	18	The lemma of Burnside and counting	21.1-21.4
25/11	19	Error correcting codes	24.1-24.4
28/11	20	Generating functions and partition of positive integers	25.4, 26.1-26.5
29/11	21	Problem session	
30/11	22	Graphs, Eulerian and Hamiltonian graphs, colorings	15.1-15.7
2/12	23	Planar graphs	
5/12	24	Bipartite graphs and matchings	17.1-17.6
7/12	25	The max-flow min-cut theorem	18.1-18.4
8/12	26	Problem session	
9/12	27	Repetition	
19/12		Exam 14.00-19.00	