Discrete Mathematics SF1610 TCOMK VT21

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Course Description

The overall goal of this course is to provide basic knowledge in discrete mathematics. The topics we will cover roughly fit in the following areas:Number theory and modular aritmetic, proof techniques, set theory and combinatorics, group theory, applications in encryption and error-correcting codes, boolean algebra, and graph theory.

Course literature

- Eriksson & Gavel - Discrete Mathematics and Discrete Models, Studentlitteratur.

- Eriksson & Gavel - More discrete mathematics, Studentlitteratur.

Course plan

In the following tables you will find a tentative course plan organized by week, and the recommended exercises for each topic. The chapters marked with * correspond to the material found in More discrete mathematics.

Week	Contents	Book sections	Exams
12	Course intro. Set theory. Cardinality.	2.1 - 2.6	1st exam
	Relations and functions.	8.1.1, 8.1.4-8.2.3	
	Arithmetic. Prime numbers. Euclid's algorithm. Fundamental theorem of arithmetic.	3.1, 3.2.1, 3.2.2, 3.2.4	
	Diophanitine equations.	3.2.5	
13	Modular arithmetic.	3.3 , 3.4	
	Recursion and induction.	4	
14	Easter		
15	Multiplication principle. Probability.	5.1, 5.2	2nd exam
	Binomial coefficient. More combinatorics.	5.2	
	Permutations and choice. Stirling numbers.	5.3, 5.4	
	Set partitions. Inclusion-Exclusion	5.5	
16	Introduction to groups.	*2.1.1 - *2.1.3	3rd exam
	Cyclic groups. Lagrange's theorem.	*2.1.4 - *2.1.7	
17	Permutation groups.	*5.1	
	Error-correcting codes. Encryption.	*3.1 - *3.2	4th exam
18	Error-correcting codes. Encryption.	*3.1 - *3.2	
	Boolean algebra.	7.1 - 7.3	
19	Graphs. Euler cycles. Hamiltonian cycles. Trees.	6.1 - 6.4	5th exam
	Planar graphs	*7.1	
20	Extras and reviews		

Week	Recommended exercises
12	**Chapter 2:** 5, 7, 9, 12, 14, 17, 23, 34, 47, 48, 52-57. **Chapter 8:** 4, 5, 24, 36, 39, 46, 55(a,b), 56,57, 64a,b, 73. **Chapter 3:** 2, 3, 5, 7, 8, 9, 10, 19, 25, 26, 28, 51, 55, 58.
13	**Chapter 3:** 30, 31, 38, 39, 46, 61, 63, 65. **Chapter 4:** 6, 20, 21, 23, 24, 32, 33, 39, 46, 49, 50,51.
14	Easter
15	**Chapter 5:** 3,4,7,8,9,10,11, 20, 22, 23, 24, 28, 29, 30, 31, 32, 35, 36, 52, 54. **Chapter 5:** 56, 57, 62, 64, 72, 73, 75, 77, 79, 80.
16	**Chapter 2 in *:** 1, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 34, 35, 36, 38, 39, 40.
17	**Chapter 5 in *:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 16, 20, 21.
18	**Chapter 3 in *:** 4, 5, 8, 9, 14, 17, 18, 19, 20, 29, 31, 34, 35, 37, 38, 40. **Chapter 7:** 16-21, 32, 33, 34, 35, 72, 73.
19	**Chapter 6:** 3, 14, 15, 16, 31, 39, 41, 42,50, 56, 62, 65, 68, 99, 100, 103, 104. **Chapter 7.1 in *:** 1, 2, 7
20	Extras and reviews

    Change of the course plan. Please note that the course plan is subject to change, and that it is the student's obligation to keep aware of developments. It is your responsibility to be aware of any changes the instructor may make to the course plan as they are announced in class. Students are responsible for all information given when they are absent.

Examination

There will be so called continuous examination. The course is divided into five parts and for each part there is a 60 min long written (partial) exam, see Schedule for details. If you pass all five partial exams you will at least receive the grade E on the course. For higher grades you should, on the final exam, have solved problems from all parts of the course.

The final exam is divided into three parts (part I, part II and part III). Part I consists of 5 problems, each worth 3p. If you have passed partial exam i you will automatically get 3p on problem i in part I. Part II consists of 3 problems, each worth 4p. Part III consists of 2 problems, each worth 5p. The final exam is worth 37p in total. Your grade on the course is based on your score on the final exam:

A: 32p, B: 27p, C: 22p, D: 18p, E: 15p.

If your score is 13-14, then you have the right to a complementary exam. There will be no make-up quizzes or midterm exams. If you need to reschedule some of those, please discuss it with the instructor in advance. Rescheduling will be accepted in extraordinary situations.

The five partial exams will be in the following dates:

- 14 April 2021 (Wednesday 13:00 - 15:00)

- 28 April 2021 (Wednesday 15:00 - 17:00)

- 4 May 2021 (Tuesday 13:00 - 15:00)

- 12 May 2021 (Wednesday 10:00 - 12:00)

- 21 May 2021 (Friday 13:00 - 15:00)