

UPPSALA UNIVERSITET  
 MATEMATISKA INSTITUTIONEN

Anders Johansson  
 E-post: andersj@math.uu.se  
 Tel: 0705-383418  
 Web: <http://www2.math.uu.se/~andersj/graphtheory>

Graph Theory  
 MaKand, IT  
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**Literature** Grimaldi, Ralph P.; *Discrete and combinatorial mathematics*, 5th edition, Pearson Addison Wesley, 2004. Chapters 11-13

Extra material handed out.

### Preliminary lesson and exercise planning

No	Section	Content	Proposed exercises
1	11.1	Definitions and examples, paths and cycles	2,4,6,7,8,10,13,14,15,16
2	11.2	Subgraphs and graph-homomorphisms	1,2,4,5,7,8,10,11,13
3	11.3	Degrees, parity and euler tours	1,2,3,5,8,11,13,16,26,27,30,32,33,37
4	11.4 (+)	Planar graphs, cycles and cuts	1,2,11,13,17,19,21,22,23,27,28
5	11.5	Hamiltonian graphs	1,2,4,10,12,18,20,21,25,26
6	11.6	Chromatic properties	1,2,4,7,8,9,14,16,17,18,19
7	11.6 (+)	More about colourings	<b>S11</b> 17,18,21,22, (+)
8	12.1	Acyclic graphs and trees	2,4,5,7,9,10,11,18,19,21,22,23,25
9	12.2	Rooted trees and search	1,2,5,7,9,10,12,14,15,16,19,20
10	12.3	Trees and sorting	1,3,4
11	12.4	Trees and codes	1,3,6,7
12	12.5	Decomposition into blocks	1,4,5,6,7,8,12,13 <b>S12</b> 5,6,7,8,11,14
13	13.1	Shortest path problems	1,2,4,5,6,7,9
14	13.2	Greedy algorithms and minimum spanning tree träd	1,2,4,5,6,7,9
15	13.3	Transport networks	1,3,6 (+)
16	13.3 (+)	Transport problems	
17	13.4	Matchings in bipartite graphs	1,2,4,5,7,13 <b>S13</b> 5,6,8,9
18	13.4 (+)	Duality principles in linear programming	
19	(+)	Random graphs and random graph statistics	
20		Tutorial (buffer)	

Proposed exercises are found in the sections. **SXX** refers to supplementary exercises at chapter endings. The mark (+) signify extra material for reading/exercises.

**Teaching format:** We have twenty combined lectures and tutorials. Weight will be put on problem solving.

**Examination** We will have four “problem sessions”, where you can present your own solutions to problems. Problem sheets will be handed out and posted at least a week in advance. Details about dates etc., will be posted on the course page later.

Participation in the problem sessions (at least 2/4) will give bonus at the written exam in December; the first exam-question will automatically be graded with full points.