MAT2250 Exercise list by chapter
Spring 2020

Chapter 1
1.8*, 1.9, 1.11, 1.12, 1.14, 1.15, 1.26, 1.32, 1.37, 1.45*, 1.46, 1.54, 1.58
Chapter 2
2.8, 2.9, 2.11, 2.13*, 2.15, 2.37, 2.38, 2.42*
Chapter 3
3.1, 3.9*, 3.10, 3.15, 3.18, 3.24, 3.36
Chapter 5
5.1*, 5.7, 5.14, 5.16, 5.22, 5.23
Chapter 6
6.1, 6.3*, 6.14, 6.23*, 6.28, 6.43
Chapter 7
7.5, 7.8*, 7.15, 7.26*, 7.29*, 7.30, 7.32 (in 7.29 you can also use a directed incidence matrix for an arbitrary orientation of G and work over the reals)
Chapter 8
Sections 8.1, 8,2, 8.3
8.1, 8.6, 8.9*, 8.30, 8.35, 8.38, 8.40
Section 8.4
8.11*, 8.17, 8.43*, 8.44
See also exercises at the end of the screencast/pdf for the supplementary topic "Tropical arithmetic and graph algorithms".
Chapter 12
Sections 12.1 and 12.2
12.3, 12.5*, 12.20, 12.23, 12.30*
Sections 12.3 and 12.4
12.14, 12.36, 12.41* (done in zoom session), 12.44*, 12.45.
Additional exercise: Show that there exists a finite projective plane of order n if and only if there exist $n-1$ orthogonal latin squares of order n.
(Hint: Consider two points x, y of the plane and the line L passing through them. Enumerate the other lines through x by $L_1, \dots L_n$ and the lines through y by $J_1, \dots, J_n$. Think about the n^2 points of the plane that are not contained on L as the n^2 entries of a latin square where the point p_{ij} corresponds to entry (i, j) if p_{ij} is on lines L_i and J_j. The L line contains $n-1$ other points and there are exactly n lines through each of these points. Use each of these $n-1$ points to come up with a latin square so the $n-1$ squares are mutually orthogonal.)
Chapter 13
13.5*, 13.9*, 13.12 13.16*, 13.17, 13.31, 13.36, 13.37, 13.46* (what is the generating polynomial of the dual code?)
Chapter 14
14.9*, 14.10, 14.22*, 14.23, 14.27