Chapter 1. A Century of Knot Theory
Study Guide

The following is a brief list of topics covered in Chapter 1 of Charles Livingston's *Knot Theory*, The Carus Mathematical monographs, Volume 24 (MAA, 1993). This list is not meant to be comprehensive, but only gives a list of several important topics. You should also carefully study the proofs given in class and the homework problems.

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A. Vandermonde and topological properties of knots, C. F. Gauss and Listing and linking numbers, P. Tait and the beginnings of knot theory, enumerating knots in terms of the number of crossings, drawings of knots, overcrossing/undercrossing, trivial knot/unknot, equivalent knots, Max Dehn and the left/right-handed trefoil knots, J. W. Alexander and the Alexander polynomial, knot invariant, Kurt Reidemeister and *Knotentheorie*, torus knot, fundamental domain and the drawing of torus knots, H. Seifert and the Seifert surface of a knot, H. Schubert and connected sums $K\#J$, prime knots, the Dehn Lemma and its proof by C. Papakyriakopoulos, algebraic versus geometric information, the use of graph invariants to draw certain conclusions (Murasugi's use of the Alexander polynomial to show the graph in Figure 1.6 cannot be drawn with alternating crossings), John H. Conway and the Conway polynomial, Gordon and Luecke's 1989 result that if complements of knots are equivalent then the knots are equivalent, *Journal of Knot Theory and Its Ramifications*, Richard Crowell and Ralph Fox's 1963 *Introduction to Knot Theory*, W. B. Raymond's 1997 graduate text *An Introduction Knot Theory*.

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