

TOPICS FOR MATHEMATICS 205A, FALL 2014, PART TWO

Reference are to sections Munkres, *Topology* (Second Edition), with supplementary references to Hatcher, *Algebraic Topology*. Generally speaking, the sections in Hatcher contain more material than the course covers, and the contents of Munkres match the course content better. This outline lists the sections of the course notes `fund-gp.pdf` that will be covered on course and qualifying examinations.

0. Introduction (Hatcher, Preface)

VIII. Topological deformations and approximations

1. Homotopic mappings (Munkres, 51–52; Hatcher, 0–1.1)
3. Homotopy classes of mappings (Munkres, 51–52, 58; Hatcher, 0)
4. Homotopy types (Munkres, 58; Hatcher, 0)

VIII. The fundamental group

0. Default hypotheses
1. Definitions and basic properties (Munkres, 52; Hatcher, 1.1)
2. Important special cases (Munkres, 53–54, 65, 73; Hatcher, 1.1)
3. Covering spaces (Munkres, 53; Hatcher, 1.3)
4. Fundamental groups of spheres (Munkres, 59)
5. Simply connected spaces (Munkres, 53)

IX. Computing fundamental groups

1. Free groups (Munkres, 67–69; Hatcher, 1.2)
2. Sums and pushouts of groups (Munkres, 68; Hatcher, 1.2)
3. The Seifert – van Kampen Theorem (Munkres, 70; Hatcher, 1.2)
4. Examples and computations (Munkres, 59, 71–72; Hatcher, 0, 1.2)