# TOPICS FOR MATHEMATICS 205A, FALL 2014, PART ONE

References are to sections Munkres, *Topology* (Second Edition) (= **M**), and the outline of topics is taken from `gentopnotes2014.pdf`. Sections from that outline which are assumed from prerequisite courses are not listed, and sections in *italics* are only covered partially or lightly; in most cases the sections cover topics probably seen in previous courses but needed as a basis for material presented here.

0. Introduction (**M** Preface, Note to the Reader)

## I. Foundational material

2. *Products, relations and functions* (**M** 5–6, 8)

## II. Metric and topological spaces

1. *Metrics and topologies* (**M** 12–14, 16, 20)
2. *Closed sets and limit points* (**M** 17)
3. *Continuous functions* (**M** 18–21)
4. *Cartesian products* (**M** 15, 19)

## III. Spaces with special properties

1. Compact spaces (**M** 26–27)
3. *Implications of completeness* (**M** 48)
4. Connected spaces (**M** 23–25)
5. Variants of connectedness (**M** 23–25)

## V. Constructions on spaces

1. Quotient spaces (**M** 22)
2. Sums and cutting and pasting (no specific reference)

## VI. Spaces with additional properties

1. Second countable spaces (**M** 30)
2. Compact spaces – II (**M** 26–28)
3. *Separation axioms* (**M** 31–33, 35)
4. Local compactness and compactifications (**M** 29, 37, 38)
5. Metrization theorems (**M** 39–42)

**Notes.**

(1) Section I.2 is included because it contains notational conventions which are not in Munkres but are used throughout the course.

(2) Only the portions of Section III.3 before the subheading *Baire spaces* are covered in this course.

(3) The coverage of Section VI.5 will be extremely light, consisting mainly of the statements of the main results, with proofs limited to showing that metric spaces satisfy the conditions in certain definitions.