List of topics for the preliminary exam in topology

- Continuity
- Connectedness
- Compactness
- Separation axioms
- Metric spaces
- Product spaces
- Complete metric spaces
- Baire Category Theorem
- Urysohns Lemma
- Tietze Extension Theorem
- Metrization theorems
- Imbedding theorems
- Tychonoff’s Theorem
- Fixed point theorems
- Function spaces
- Topological groups
- Identification spaces
- Quotient spaces
- Fundamentals of homotopy theory
• Fundamental group and covering spaces
• Fundamental group
• Covering spaces
• Covering homotopy theorem
• Browder fixed point theorem
• Second homotopy group
• Group actions on spaces
• Lifting criteria for covering spaces
• Criteria for universal covering spaces
• Isometries and the geometry of group actions
• van Kampen’s theorem
• Euler characteristic
• Classifying Platonic solids
• Borsuk-Ulam theorem
• Fundamental theorem of algebra
• Group presentations via van Kampen
• Ends of groups
• Hyperbolic groups
• Homology (simplicial, cellular, and singular)