Qualifying exam syllabus for TOPOLOGY (MTG 6346-7):
Textbook: "Algebraic Topology" by Hatcher.

Exam syllabi:

Fall Semester (MTG 6346):
Homotopy and homotopy type. Deformation retracts and deformation retractions. Contractible spaces.
The fundamental group. The fundamental groups of the circle. A topological proof of the Fundamental Theorem of Algebra.
The Seifert-van Kampen Theorem.
Surfaces and their fundamental groups.
Covering spaces.
Exact sequences, 5-lemma. Homology groups, homology exact sequence. Homotopy invariance of homology groups. Excision.
Homology groups of n-dimensional sphere. The Brouwer Fixed Point Theorem. The degree of a map $S^n \to S^n$. Vector fields on S^n.
The Euler characteristic. Lefschetz Fixed Point Theorem

Spring semester (MTG 6347):
Homology and the Borsuk-Ulam Theorem.
Cohomology. The cup product and the cap product.
The Universal Coefficient theorem.
The Künneth Formula.
Manifolds. Orientation. Homology and cohomology of manifolds.
Poincaré Duality.