

# Study Guide for Topology Exam

## General Topology

Topological spaces, continuous functions, product and quotient topology [1, ch. 2]  
Connectedness and compactness [1, ch. 3]  
Countability and separation axioms, Urysohn lemma, Tietze theorem [1, ch. 4, except §36]  
Complete metric spaces and function spaces [1, §43, 45]

## Algebraic Topology

Classification of surfaces [2, ch. I]  
Fundamental group [2, ch. II], [3, §1.1]  
van Kampen's theorem [2, ch. III, IV], [3, §1.2]  
Classification of covering spaces [2, ch. V], [3 §1.3]  
Homology:  
  
simplicial, singular, cellular; computations and applications [3, ch. 2], [4, ch. 4]  
Degree of a map of  $S^n$  [3, p. 134], [4, §21]  
Euler characteristic [3, p. 146], Lefschetz fixed point theorem [3, p. 179], [4, §22]

*The weight of topics on the exam should be about 1/3 general topology and 2/3 algebraic topology.*

## References

- [1] J. Munkres, *Topology*, second edition, Prentice-Hall, 2000.
- [2] W. Massey, *A Basic Course in Algebraic Topology*, Springer-Verlag, 1991.
- [3] A. Hatcher, *Algebraic Topology*, Cambridge U. Press, 2002.  
(Revisions and corrections  
<http://www.math.cornell.edu/~hatcher/AT/ATpage.html> )
- [4] J. Munkres, *Elements of Algebraic Topology*, Addison-Wesley, 1984.

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