

**TOPOLOGIE I**  
**Belengnr. 241855 – Winter Semester 2007/08**  
**University of Bielefeld**  
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**SYLLABUS**

- I. Metric spaces
  1. Metrics.
  2. Convergence of sequences and continuity of maps on metric spaces.
  3. Open sets and neighborhoods in metric spaces.
  4. Complete metric spaces.
  
- II. Topological spaces
  1. Topologies.
  2. Basic topological notions.
  3. Continuous maps and homeomorphisms. Topological invariants.
  4. Subspaces and product spaces.
  5. Quotient spaces.
  6. Nets.
  
- III. Separation Axioms
  1. Hausdorff spaces.
  2. Regular spaces.
  3. Normal spaces.
  4. Metrization theorems.
  
- IV. Compact spaces
  1. Compact spaces.
  2. Compact metric spaces. Use of sequences.
  3. Use of nets. Proof of Tychonoff's theorem.
  4. Locally compact spaces.
  5. One-point (Alexandroff) compactification.
  6. Baire theorem for complete metric spaces or locally compact spaces.
  
- V. Connectedness
  1. Connected spaces.
  2. Pathwise connected spaces and applications.

**BIBLIOGRAPHY**

1. Volker Runde, *A taste of Topology*, Universitext. Springer, New York, 2005.
2. James Dugundji, *Topology*, Reprinting of the 1966 original. Allyn and Bacon Series in Advanced Mathematics. Allyn and Bacon, Inc., Boston, Mass.-London-Sydney, 1978.
3. Stephen Willard, *General Topology*, Reprint of the 1970 original [Addison-Wesley, Reading, MA]. Dover Publications, Inc., Mineola, NY, 2004.