

Basic Concepts in Topology and Geometry

201.2.522. Fall 2018 (D.Kerner)



This is the first introduction to Algebraic Topology and some very basics of Manifolds.

Site of the course: www.math.bgu.ac.il/~kernerdm

Prerequisites: Calculus 3, Algebraic Structures 1, some basics of point-set topology.

Homework.0 is an important preparation step, it is to be fully solved before the first lecture.

The structure of the final grade

During the semester there will be about 10 sets of homeworks. Several questions in each of them will be for submission.

There will be one or two midterm exams and the final exam.

The final grade= 10% (homeworks) + 10% (each midterm) + (70% or 80%)(final.exam).

The program (approximate and tentative)

- (1) Basic operations on topological spaces. Cell structure. Homotopy equivalence.
- (2) Fundamental group. Covering spaces. Applications.
- (3) Homology (simplicial and singular). Applications.
- (4) Cohomology.
- (5) Smooth manifolds. Differential forms and De Rham's theory.
- (6) Additional topics

Bibliography

- A. Hatcher, *Algebraic topology*. Cambridge University Press, Cambridge, 2002. xii+544 pp.
- J. R. Munkres, *Elements of algebraic topology*, Cambridge, Mass.: Perseus Books, 1984.
- O.Ya. Viro, O.A. Ivanov, N.Yu. Netsvetaev, V.M. Kharlamov, *Elementary topology. Problem textbook*. American Mathematical Society, Providence, RI, 2008. xx+400 pp.
- G. E. Bredon, *Topology and geometry*, New York: Springer, 1995.