



Introduction to Differential Topology

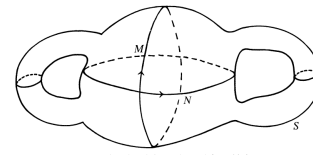
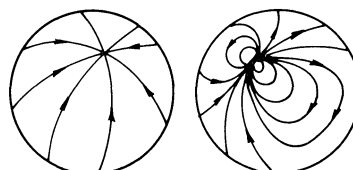
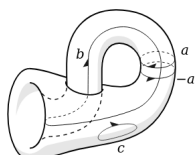
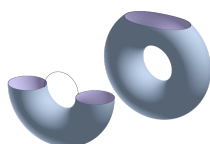
(course number: 201.2.7061. Fall 2024. Dmitry Kerner)

- The site of the course: <https://moodle2.bgu.ac.il> and <https://www.math.bgu.ac.il/~kernerdm/teaching.html>
- Prerequisites: Calculus.3, Introduction to Topology.
- Lecturer: Dmitry Kerner, [58], 217, dmitry.kerner(at)gmail.com
- Homework 0 will be posted about a week before the beginning of the semester. It is not for submission, rather to refresh and summarize the relevant prerequisites. (It should be done before the first lecture!)
- The grade: 80%(final exam)+20%(10 homework sets).
- The material for the final exam: everything from the lectures and homeworks.

* Depending on the security situation, the course requirements/materials can be changed during the semester, according to the general BGU instructions.

* Students on their military service will be allowed to submit their homeworks with delay. Their homework grade will be determined by the maximum of their 6 homework grades, provided at least 6 homeworks sets have been submitted.

Differential Topology studies topological and smooth properties of manifolds. The first questions and ideas appeared at the end of 19'th century, but the real progress began with the works of Whitney in 1930's. The field has flourished since then. Our course is a modest introduction to the area, starting from minimal prerequisites and with the goal towards some great results of the mid-20'th century.



$(M, N) = 0$, but M is not deformable into $S - N$.

- The (preliminary) syllabus:
 - i. Basics of smooth manifolds and smooth maps.
 - ii. Regular values. Theorems of Sard and Brown.
 - iii. Transversality and intersections. Degree of a mapping.
 - iv. Morse theory, handle decomposition, surgery, cobordisms.

- **Bibliography:**

- i. V. Guillemin, A. Pollack "Differential Topology".
- ii. M. W. Hirsch, "Differential Topology".
- iii. A. Wallace, "Differential Topology. First Steps".
- iv. J. Milnor, "Topology from the differentiable viewpoint".
- v. C.T.C. Wall, "Differential Topology".