

Math 5046

Geometry/Topology II: Differential Topology

Aliakbar Daemi

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E-mail: adaemi@wustl.edu

Class Hours: T/Th 2:30-3:45pm

Office Hours: MW 4:00-5:30 pm (tentative)

Course website: <https://www.math.wustl.edu/~adaemi/manifolds.html>

Course Overview

This is an introductory graduate-level course about the topology of smooth manifolds and vector bundles. The prerequisite for the course is Math 5045 (GT I: Algebraic Topology) or permission from the instructor. The main topics that we cover in the course include:

- Smooth manifolds,
- Vector bundles with a focus on tangent and cotangent bundles,
- Lie groups and Lie algebras,
- Differential forms, integration and Stokes theorem,
- De Rham theory.

The class meets online. You can find the Zoom information about our class meetings on Canvas. Although I don't keep track of attendance, I would expect you to attend the class regularly. I also encourage you to leave your camera on during the Zoom meetings if it is possible for you. There will be up to 5% bonus credit for active participation in the class.

Course Textbook

- The main reference for the course is the book *Introduction to manifolds* by Loring Tu.
- Other books that you might find helpful include:
 - *Introduction to Smooth Manifolds* by John Lee,
 - *An Introduction to Differentiable Manifolds and Riemannian Geometry* by William Boothby,
 - *An Introductory Course on Differentiable Manifolds* by Siavash Shahshahani.

Homework

There will be a weekly homework assignment. The problems will be posted online in Corwd-mark, and you should upload your solutions there. The problem set posted each week is due on Wednesday of the following week at 10:00 pm. You are encouraged to turn in your homework in **Latex**. This would be a good practice to work with a software that is used to write almost all math papers. In addition, you can earn up to 5% bonus credit by turning you assignments in Latex.

You may refer to any book you like, even those that are not assigned, but not to any internet resources. Collaboration is allowed, but you must write up your own solutions. Any major ideas gained from your classmates or from a book should be cited.

Exams

In addition to the final exam, there will be an in-class midterm on **Thursday, March 11**.

Grading

There will be fourteen weekly assignments, and each of them is worth 5% of your final grade. If you turn in a homework in Latex, you can earn an additional 1%. This applies to your top five grades, turned in Latex format, where your grade will be multiplied by 1.2.

Each of the final and the midterm is worth 15% of your final grade.

Disability Services

If you require accommodations for a disability which affect your work during the exams or the class, please contact the [Office of Disability Resources \(DR\)](#) promptly to discuss appropriate arrangements. Send your VISA (which you will receive from DR) to me at least two weeks in advance of the midterm so your accommodations can be arranged.