

MATH437, Spring 2020

General information for Tamás Darvas' students

Instructor: Tamás Darvas, tdarvas@math.umd.edu.

Grader: Chenzi Jin, cjin123@umd.edu.

Course Website: www.math.umd.edu/~tdarvas/teaching.html.

Email: tdarvas@math.umd.edu. Be sure to include "Math 437" in the subject line.

Class: TTh 2:00 PM - 3:15 PM, MTH 0303.

Office hours: Tu 1pm - 2pm and Th 3:25-4:25 in my office (MATH 4416).

Syllabus: This course is an introduction to differential forms and their applications. The exterior differential calculus of Elie Cartan is one of the most successful and illuminating techniques for calculations. The fundamental theorems of multivariable calculus are united in a general Stokes theorem which holds for smooth manifolds in any number of dimensions. This course develops this theory and technique to perform calculations in analysis and geometry. This course is independent of Math 436, although it overlaps with it. The point of view is more abstract and axiomatic, beginning with the general notion of a topological space, and developing the tools necessary for applying techniques of calculus. Local coordinates are necessary, but coordinate-free concepts are emphasized. Local calculations relate to global topological invariants, as exemplified by the Gauss-Bonnet theorem.

Textbook: for the first part of the course I will use lecture notes by A. Hatcher "Notes on Introductory Point-Set Topology" (available on the course website), the main part of the course will use the book of M.P. do Carmo "Differential Forms and Applications", time permitting we might take excursions into K. Janich "Vector Analysis".

Assignments: around 8-9 homework assignments which will amount to a third of your grade. Assignments are due in one week, in class. No late homework will be accepted out of consideration to the grader. If you have questions about homework grading policy please address them to the grader directly. There will be a take home midterm (date TBD) and a comprehensive in class final exam on May 18. Both will amount to a third of your grade.

Prerequisites: This course requires "appropriate mathematical maturity" according to the UMD course catalog. I strongly agree. Recommended prerequisites are: MATH 403, **MATH 405**, **MATH 410**, MATH 411, MATH 432 or MATH 436, with the core essentials in bold.

Absences: Absence for medical reasons on days when exams are scheduled requires documentation of the illness, signed by a health care professional.

Academic integrity: The University has a nationally recognized Honor Code, administered by the Student Honor Council. The pledge, approved by the University Senate, reads: "I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination." Unless specifically advised to the contrary, the Pledge should be handwritten and signed on all tests in this course. In conjunction with the University's Code of Academic Integrity, allegations of academic dishonesty will be reported to the Honor Council.