Math 532—Winter 2017—CRN 23813 and 23821

Course Information

Instructor	Robert Lipshitz
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Office	Fenton 303
Office Hours	M 3–3:50, W 11:30–12:30, F 3–3:50 Subject to change.

Course Prerequisites	Math 432 requires Math 431 (Introduction to Topology 1), Math 341 (Linear Algebra), and Math 281 (Several Variable Calculus). Math 342 and 282 are strongly recommended, and Math 413 is recommended. Math 532 is open to any beginning mathematics graduate student, but students in Math 532 are expected to learn any background they are missing on their own. Anyone except a math graduate student seeking to enroll in 532 should obtain the instructor's permission.
Course Requirements	There will be written homework due roughly once a week, initially on Wednesdays. The first written homework assignment is due on Friday of the first week of classes. There will be an in-class midterm exam and an in-class final exam. There *will* be new material covered and a homework assignment due during dead week (the last week of classes).
Test Dates	*Midterm*: February 13. Subject to change if necessary. *Final exam*: per Registrar's schedule. Generally, there will *not* be makeup exams. If you are unable to attend the exam, contact me in advance to discuss whether other arrangements are possible. If you are unable to attend an exam because of an emergency, contact me as soon as possible; you will be asked to provide documentation of the emergency.
Grading Policy	Written Homework 35% Midterm 25% Final Exam 40% Late homework will typically not be accepted.
Students with disabilities	The University of Oregon is committed to an inclusive learning environment. If you have a disability which may impact your performance on exams, please contact the Accessible Education Center to discuss appropriate accommodations. If there are other disability-related barriers to your participation in the course, please either discuss them with me directly or consult with the Accessible Education Center.

Course Policies:

- Cell phones, computers, etc. are not permitted in this class except by instructor's permission. (They don't bother me, but there is strong evidence they distract other students.)
- Students are expected to read the sections in the textbook *before* they are covered in class.
- Electronics, notes and the textbook are not permitted on exams.
- Written homework must be turned in at the beginning of class on the due date. (If you can't make it to class, put it in the mailbox in Fenton before class.)
- You are welcome to work on the homework together, but you must write up your final answers by yourself. Failure to abide by this policy constitutes cheating.
- Any resources you use when solving homework problems, other than the textbooks, must be cited in your homework. You may not use electronic resources (e.g., Google) other than the textbook and recommended textbook. Failure to follow this policy constitutes cheating; if you are caught cheating on the homework you will receive a 0 for the homework portion of the class and will be reported to the administration. Failure to cite sources constitutes academic misconduct.
- Requirements for students in Math 431 and 531 are slightly different. In addition to the requirements for Math 431, students in Math 531 are expected to:
  - Solve at least one of the "challenge" homework problems per week.
  - Type the solutions to their homework assignments in LaTeX.

  Graduate students may skip the first non-challenge problem on each homework set.

Course Resources:

- Textbook: *Introduction to smooth manifolds*, second edition, by John Lee.
- We will use Canvas to track grades and post some solutions.
- Course website, with up to date syllabus and assignments:

  `http://pages.uoregon.edu/lipshitz/Teaching/Wi17Ma532.html`

  or

  `http://goo.gl/amMT7A`

Getting Help: I have office hours every week. Get help as soon as you feel confused. See the course webpage for additional advice.

Course goals: The main goals of this course (learning outcomes) are:

- Mastering the total derivative, chain rule, inverse function theorem, and implicit differentiation in their modern forms.
- Learning the definition of a smooth manifold and smooth maps between manifolds, and developing a library of examples of these.
- Understanding tangent vectors and the tangent space to a smooth manifold, and how to work with them.
- Being able to differentiate smooth maps between manifolds.
- Recognizing special classes of smooth maps—immersions, embeddings, and submersions.
- Understanding Sard's theorem and the Brouwer degree.
- Understanding why it is hard to comb a cat.