Math 6510 - Differentiable Manifolds
Fall 2021
Ken Bromberg

Office: JWB 303

Office hours: TBD

Class hours: 10:45 - 11:35 MWF

Room: LCB 222

Syllabus: This course is an introduction to differentiable manifolds. Some of the topics covered include:

- Definition and basic examples;
- Vector bundles - tangent and cotangent bundles specifically;
- Vector fields and flows;
- Distributions and the Frobenius theorem;
- Transversality and intersection theory;
- Basics of Lie groups;
- DeRham cohomology.

My spiel on this course: Most of the new concepts and difficult ideas in this course will occur in the definitions. Very roughly the course is a combination of the inverse function from multi-variable calculus, linear algebra plus a lot of definitions. This can make the material at times seem dry (although I will do my best to not let this happen!).

Book: The main reference for the course will be *Introduction to Smooth Manifolds* by John Lee, however, I won't always follow the book. Some homework problems will come from the book.

Grades: Grades will be based on regular homework (30%), a midterm (30%) and a final exam (40%). Homework should be written in LaTeX and submitted via canvas. The midterm will be taken during class time and the final will be a two hour exam during the classes scheduled exam time.

Receiving an "A" in this course is equivalent to a high pass on the differentiable manifolds qualifying exam. An "A-" or "B+" is a pass. If you receive a grade lower than this you will still need to take the exam.

Homework: I'm anticipating that that there will be around 8 assignments for the course (roughly every two weeks). The homework will be done in groups. This does not meet you should split up the problems among your group and only work on a subset of the problems. As with all math classes doing homework is essential for learning and it is important that you think about and understand the solution of all the assigned problems.

Midterm: There will be a midterm during class time on October 8th during our regular class time.

Final: The final exam is December 15th from 10:30 AM - 12:30 PM.

Deadlines: This is a graduate course and my general belief is that you should be in the best position to manage your own time. This will certainly be necessary once your focus turns to research. On the other hand it is good to have some structure. With this in mind I will set due dates for the homework but if you would like to turn in your homework late you should write me to arrange a new deadline. I will generally approve any reasonable requests (perhaps after asking for some clarification) but these new deadlines will be strict. You should plan on taking both the midterm and final at the scheduled time. If you cannot you should let me know as soon as possible and these requests will be dealt with on a case-by-case basis.