

Math 7853 - Introduction to Teichmüller Theory
Fall 2020
Ken Bromberg

Class hours: 9:40 - 10:30 MWF via Zoom

Zoom meeting:

<https://utah.zoom.us/j/97943909344>

Meeting ID: 979 4390 9344

Passcode: Teich

Syllabus: This course will be an introduction to Teichmüller theory. The course should be accessible to anyone who has taken the first year courses in pure math at Utah (6210-20, 6310-20, 6510-20). However, my expectation is that the students will have a range of backgrounds and on occasion I may discuss topics that require more background.

We will begin with a discussion of quasi-conformal maps: the geometric and analytic definitions, compactness theorems, the measurable Riemann mapping theorem. We will use this material to construct the Teichmüller space of a finite type surface and describe its structure as a complex manifold. We will also prove Teichmüller's theorem on the existence and uniqueness of minimizing quasi-conformal maps between surfaces.

My plan is to go through this material carefully and avoid appealing to "black boxes" as much as possible. I anticipate that this will take 2/3rds of the course. For the remainder of the course we will discuss some more advanced topics but in less detail and with more of a reliance on black boxes. These advanced topics will either be further topics in Teichmüller theory/hyperbolic surfaces or topics in hyperbolic 3-manifolds.

Format: This course is an **IVC** (Interactive Video Conferencing) course. We will meet via Zoom during the regularly scheduled class time (MWF 9:40-10:30). Zoom is free software that can be downloaded at zoom.us/download. You will be able to participate most fully with a laptop/tablet, microphone and webcam. I find the tablet particularly useful for using the shared whiteboard feature of Zoom or whatever drawing app that the tablet has. However, you only need a phone to listen.

For most classes I will lecture which I will record and post. I will be writing on an iPad and will also post my notes. You will be able to ask questions either in the chat function on Zoom or verbally. As I will post these lectures so that anyone in the class can listen to them later (they will be deleted at the end of the course) you should not reveal any personal information during lecture.

I have gained some experience working with Zoom in the past few months but it is still relatively new to me (and I expect for you) so it may take some getting used to.

The class will be a more effective learning experience if it is interactive so please don't hesitate to ask questions during lecture. When you are not asking a question you should keep yourself on mute so that we don't have any extra background noise.

We will also occasionally use class time to work in small groups on problems. Here we will use the "breakout room" feature of Zoom so that you can be split into groups. When we do this I may first record a preliminary brief lecture on the problems to get you started. I will expect that you will have watched them before class.

Office Hours: Office hours will also be over Zoom. I'll announce times after consulting with the class and post them on Canvas during the first week of classes. I'm also available to meet outside of office hours. You should send me an email to arrange a time to meet and let me know your availability in the email.

Stallings Seminar: Usually associated to the semesters topology topics course is an associated student seminar where students present lectures on material related to the course. Normally this would run every week but as I am concerned about "Zoom burnout" we may do this somewhat less. We can discuss this during the first class. You can receive credit for participating in the Stalling seminar.

Grades: My intention is to give every registered student who participates in the course an "A". Here I would like to leave "participate" loosely defined but this will be a combination of attendance, working on problems (sometimes in class) and participating in the discussion. If I am concerned that you are not participating sufficiently I will let you know.