Math 2260: Riemann Surfaces

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Office Hours: Thursdays 11-12 or by appointment
Lectures: MWF 2-2:50
Location: Kassar House 105
Course web page: https://www.math.brown.edu/jk17/2260.html

Textbook, Notes, and Resources: The official textbook will be *Lecture Notes on Riemann Surfaces* by Otto Forster; it can be obtained for free as a PDF from the Brown library, and you can also order a copy for $25 from Springer, with a Brown login. I will be skipping over most of Part I and concentrating on Parts II and III; I will also omit much of the sheaf theory of Part II, because we can prove all the major theorems without it. This will of course be explained in detail in the lectures, and also in lecture notes that I will make available. You may also enjoy reading the notes by my adviser, Curtis T McMullen, which for the most part follow Forster. They are available at http://people.math.harvard.edu/~ctm/home/text/class/harvard/213b/19/html/home/course/course.pdf

Course Goals: We will plan to cover the following material:

1. Definition of a Riemann surface and examples.
2. Holomorphic forms, divisors, line bundles, residues, and integration. The statement of the Mittag-Leffler, Riemann-Roch, Abel, and Jacoby theorems.
3. Smooth dz and $\overline{dz}$ forms and the $\overline{\partial}$ operator. The $\overline{\partial}$ Poincare Lemma, Weyl's Lemma, and McMullen's amazing little $\overline{\partial}$ theorem[1]. Proofs of all the classical theorems mentioned in Item 2. Statement and proof of the Hodge theorem for Riemann surfaces.
4. Uniformization Theorem. Hyperbolic geometry and deformations of Riemann surfaces. Mumford's Theorem.

[1]Actually a much shorter and more direct proof of a well-known theorem