Math 9302, Summer 2014
Riemann Surfaces
Syllabus

Instructors: Rasul Shafikov, MC 112, `shafikov@uwo.ca` (emails will be answered within 48 hours). Office hours: TBA

Textbook: There is no required textbook for the course. Some recommend texts include

(1) O. Forster. Lectures on Riemann Surfaces. Springer, GTM 81.
(2) S. Donaldson. Riemann Surfaces. Oxford Graduate Texts in Mathematics, 22.
(3) T. Gamelin. Complex Analysis. Springer, UTM. 2001.

The first two texts will be on reserve in Taylor library.

Course web page: `http://www.math.uwo.ca/∼shafikov/9302/`
Visit this page for up to date information on the course.

Course Description: Course meets Tuesdays and Thursdays 10 AM - 12 PM in MC 108. The first class is on Tuesday May 6, and the last class is on July 10. There will be two weeks with no classes: May 19-23, and June 23 - 27.

The theory of Riemann surfaces occupies a very special place in mathematics. It is a culmination of much of traditional calculus, making surprising connections with geometry and arithmetic. It is an extremely "useful" part of mathematics, knowledge of which is needed by specialists in many other fields. It provides a model for a large number of more recent developments in areas including manifold topology, global analysis, algebraic geometry, Riemannian geometry and diverse topics in mathematical physics. (S. Donaldson).

The course is intended as a rigorous introductory course to Riemann surfaces. The material can be divided into four major parts.

(1) Abstract Riemann surfaces (basic definitions, examples, algebraic curves, quotients, function theory on Riemann surfaces)
(2) Topology of Riemann surfaces (vector fields and differential forms, Stokes theorem, De Rham cohomology, surgery on Riemann surfaces, type of a Riemann surface)
(3) The Uniformization theorem (harmonic and subharmonic functions, Dirichlet problem, Green's function, covering spaces)
(4) The Riemann-Roch theorem

Prerequisites: A solid undergraduate course in Complex Analysis. Some familiarity with basic topology, and with covering spaces.

Homework: There will be 4 homework assignments that should be submitted for marking. Tentative dates for submitting assignments:

(1) Assignment 1 due May 22,
(2) Assignmentt 2 due June 5,
(3) Assignment 3 due June 19,
(4) Assignment 4 due July 3.

Presentation: At the end of the course every registered student will give a 1/2 hour presentation on a topic prearranged with the instructor.

Evaluation: Homework = 60%, Presentation = 40%.

Senate Regulations on Scholastic Offences Please note the following points, which are required to be stated in this outline by the Senate regulations.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

`http://www.uwo.ca/univsec/handbook/`

Specifically, the following document outlines scholastic discipline for graduate students:

`http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_grad.pdf`