MAT 800

TOPICS IN ANALYSIS  Fall 2011

COURSE INFORMATION

Instructor:  Tadeusz Iwaniec

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Office Hours:  Tuesday  11:30 am – 12:30 pm
               Thursday  11:30 am – 12:30 pm
               At other times by appointment

Classes:  T Th  12:30 am – 1:50 pm  Carnegie Building  208

Text:  Notes will be provided during the course

Prerequisites:  I will assume basic knowledge of measure theory, integration, analytic functions and some functional analysis.

Course Description:  We will cover some of the following topics from complex analysis and the geometric theory of differential equations.

Conformal Geometry
- conformal structures
- quasiconformal mappings

The Concept of Ellipticity
- first order equations
- homotopy classification
- second order elliptic systems
- examples: the continuity equation and hodographic transformation

Elements of Sobolev Theory (review)
- definitions of Sobolev spaces
- embedding theorems
Complex Potentials
-the Cauchy transform
-the Beurling Ahlfors transform
-Lp estimates

Analytical Foundations of Quasiconformal Mappings
-integral formulas and estimates
-Liouville theorem
-the governing nonlinear systems

Solving the Beltrami Equations
-existence
-uniqueness
-regularity: openness and discreteness
-Stoilow factorization

Riemann Mapping Theorem for Elliptic Systems
-existence
-uniqueness
-applications

To make these lectures available to students whose mathematical knowledge may be limited, every effort will be made to reduce to a minimum the technical details and mathematical requirements. No prior exposure to these topics is assumed. You are invited to pursue the exercises given occasionally during the course.

Students with Disabilities: If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), http://disabilityservices.syr.edu, located in Room 309 of 804 University Avenue, or call (315) 443-4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible. You are also welcome to contact me privately to discuss your academic needs although I cannot arrange for disability-related accommodations. Making arrangements with ODS takes time. Do not wait until just before the first test.

Academic Integrity: The Syracuse University Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the Policy and know that it is their responsibility to learn about instructor and general academic expectations with regard to proper citation of sources in written work. The policy also governs the integrity of work submitted in exams and assignments as well as the veracity of signatures on attendance sheets and other verifications of participation in class activities. Serious sanctions can result from academic dishonesty of any sort. For more information and the complete policy, see http://academic.integrity.syr.edu