MAT 800 Topics in Analysis
Spring 2019
TuTh 12:30pm - 1:50pm, 200 Carnegie Hall

Instructor: Tadeusz Iwaniec
    Office: 304 F Carnegie
    Phone: 443-1495
    Office hours: Tu 2:00-3:00, Th 2:00-3:00, and by appointment.
    email: tiwaniec@syr.edu

Textbook: Every lecture will be either a beamer presentation or a document projector presentation. No particular text book will be used. Handouts for the presented lectures will be provided.

Course Description: The course is designed to gain insights into advances in Geometric Function Theory (GFT), Nonlinear Partial Differential Equations (PDEs) and Calculus of Variations (CV) with applied disciplines in mind. This includes basic concepts in mathematical models of Nonlinear Elasticity (NE) (the energy-minimal deformations and the principle of non-interpenetration of matter), Harmonic Mappings, Minimal Surfaces, and so forth. We shall begin with Sobolev spaces. The basic idea for defining a Sobolev space consists in using weak derivatives of locally integrable functions; more generally, Schwartz distributions which permit one to define as many derivatives as one may want. The latter is facilitated by functional analysis developed for that purpose (like Radon measures). The concepts of Null Lagrangians and Free Lagrangians that we shall introduce are effective tools in establishing existence, uniqueness and regularity results for assorted energy integrals.
The selection of topics is intended to attract graduate students (also postdoctoral scholars) to Geometric Analysis with a wide range of applications, and to help them to mature meaningful interaction with physicists and engineers already in their doctoral and postdoctoral phase.

Prerequisites: Graduate standing in mathematical sciences. To make this course available to students whose mathematical knowledge may be limited, every efforts will be made to reduce to a minimum the technical aspects and mathematical requirements. No prior exposure to these topics will be assumed.

Exams: No exams will be given. Nonetheless, participation in these lectures will be essential for passing the course.

Homework: There will be homework problems given but not collected for grading. You are encouraged to discuss the homework problems with your classmates and to work together. You are highly encouraged to ask questions in class.

Spring Break (no classes) : Sunday, March 10 - Sunday, March 17
Last day of classes: Tuesday, April 30.

Students with disabilities: If you believe that you need academic adjustments (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 or TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting academic adjustments. ODS is responsible for coordinating disability-related academic adjustments and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since academic adjustments may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Academic Integrity: Syracuse Universitys Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the Universitys academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice. The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in course failure regardless of violation level. For more information and the complete policy, see http://class.syr.edu/academic-integrity/

Religious observances policy: Syracuse Universitys Religious Observances Policy recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors no later than the end of the second week of classes. For fall and spring semesters, an online notification process is available through MySlice (Student Services → Enrollment → My Religious Observances) from the first day of class until the end of the second week of class.

I look forward to a great semester!