Math 690 - Fall 2024

MR 4:00 pm –5:30 pm

Instructor Catalin Turc (catalin.c.turc@njit.edu)

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Office hours: MR 3:00-4:00 or by appointment

WEB: **https://njit.edu/cct21/**

Course Information and policies:

- **Text:** *Partial Differential Equations*, by L. Evans
- **Course Overview**:

  1. Representation formulas for solutions: Laplace's equation, heat equation, wave equation
  2. Sobolev spaces: weak derivatives, definition of Sobolev spaces, traces, Sobolev embeddings, Poincaré's inequality
  3. Second-order elliptic equations: weak solutions, Lax-Milgram theorem, energy estimates, Fredholm alternative, regularity of solutions, maximum principles, eigenvalues and eigenfunctions
  4. Second-order parabolic equations: existence of weak solutions, regularity, maximum principles
  5. Second-order hyperbolic equations: existence of weak solutions, regularity, propagation of singularities
  6. Calculus of variations: Euler-Lagrange equations

- **Homework**: Homework problems will be assigned and collected biweekly. The homework will be 30% of the final grade.
- **Exams and Grading**: There will be one midterm and a final exam. The midterm will be 30 % of the final grade and the final 40%.