Instructor: Zaher Hani, (Office: Skiles 224), Email: zhani6@gatech.edu, 
Website: [http://www.math.gatech.edu/ zhani6](http://www.math.gatech.edu/ zhani6). 
Office hour: TBA and by appointment.

Course Description: In the first part of the course, we will continue introducing some basic topics in PDE not covered in Math 4347 last semester. Afterwards, we will focus on some PDE from physics, engineering, and economics. In particular, we will derive and start the study of partial differential equations appearing in electromagnetics and fluids (Euler and Navier-Stokes equations).

Prerequisites: MATH 4347 or equivalent. If you haven’t taken MATH 4347, and would still like to take the course, please come talk to me.

Course Coordinates: MWF 2:05–2:55 pm in Skiles 255

Resources: I will be mostly following my own notes and handouts. I recommend the following optional textbooks for reference and extra problems. They will be on reserve in the library.

2. Sandro Salsa, *Partial Differential Equations in Action: From Modelling to Theory (Universitext)*.

Homework: There will be a series of homework sets throughout the course at a roughly biweekly basis.

Grading: Homework 45%, Midterm 25%, and Final 30%. The final might be a take-home exam.

Projected topics:

1. Boundary problems
2. Green’s identities and Green’s functions
5. Fluid Mechanics:
(a) Derivation of Euler and Navier-Stokes equations.
(b) Symmetry groups and basic properties of Euler and N-S equations.
(c) Vorticity formulation.
(d) Energy Methods and local existence.