

644. Graduate Partial Differential Equations I *Fall 2012 Syllabus*

Professor: Robert Strain (strain at math.upenn.edu)

Course Web Page: <http://www.math.upenn.edu/~strain/12ma644/>

Class schedule: MW @ 10:30 - 12:00PM in DRL 4C2.

First class, last class: September 5, December 5.

Topics to be covered (subject to change):

- Four important linear PDE: Transport equation, Laplace's equation, Heat equation, and Wave equation.
- The method of characteristics.
- Fourier transform: elementary properties, Solutions of PDE's using the Fourier transform, characterization of function spaces
- Sobolev spaces, and function space techniques for solving PDE.

Homework: Weekly, posted on the course website. You will be allowed one week to complete each assignment. Collaboration between students is encouraged, but you must write your own solutions, understand them and give credit to your collaborators. (To be precise, put a list of the students with whom you collaborated on your homework.)

Late homework will not be accepted.

The two lowest homework scores will be dropped.

Exam: There will be one take home final exam at the end of the semester. This exam should be thought of like a final homework assignment. There should be no collaboration on the final exam. You may not discuss the exam with anyone other than me, Prof. Strain, while the exam is in progress.

Grading: Based upon the exam, homework and class participation.

Textbook: L.C. Evans, *Partial differential equations*, AMS, Graduate Series in Mathematics, Second Ed., Vol 19 (Required textbook). *This text will also be on reserve at the Math/Physics/Astronomy Library in DRL.*

Other references will be provided throughout the course.