Math 415-Fall 2018

Partial Differential Equations

General information

Location: Cupples I Room 215
Time: TTh 11:30am-1pm
Professor: Greg Knese
Office location: Cupples I room 214
Office hours: M 2-3pm, Tu 1:30-2:30pm, W 10-11am
Email: geknese at wustl dot edu

Course description

Official Description:

Introduction to the theory of PDE's with applications to selected classical problems in physics and engineering. Linear and quasilinear first order equations, derivation of some of the classical PDE's of physics, and standard solution techniques for boundary and initial value problems. Preliminary topics such as orthogonal functions, Fourier series, and variational methods introduced as needed. Prerequisites: Math 217 and 309, or permission of instructor.

Textbook

Introduction to Partial Differential Equations by Peter J. Olver.
Available on the wustl network at:
https://link.springer.com/book/10.1007/978-3-319-02099-0

Exams

The midterm exam is in class **October 9, 2018**.
The final exam is **December 17, 2018, 1-3pm**.

Homework

There will be weekly homework assignments. These should be written up clearly and in detail.

Collaboration: You may discuss the homework verbally with other students provided you have already given the homework a serious attempt. If you have already solved a problem and someone asks you about it, then any help you provide should consist of hints or suggestions and never complete solutions. In particular, homework should be written up independently and it should not be possible to tell who worked with whom. Do not search or post requests for solutions to HW. Do not post any course materials online.

Grade breakdown

Homework: 30%
Midterm exam: 30%
Final exam: 40%
Letter grade breakdown: A+=(97,100], A=(93,97], A-=[90,93], similar for B,C,D, F=[0,60).

Course plan

Chapters 1-4, 6 and more if we have time. In a little more detail:

Chapter 1: Basic terminology and linearity. Read independently.
Chapter 2: transport and wave equations. We will skip section 2.3.
Chapter 3: Fourier series.
Chapter 4: Heat equation, wave equation, Laplace and Poisson equations
Chapter 6: Generalized functions and Green's functions