Math 678 – Partial Differential Equations – Fall 2020

Dates/Time/Location MW 3:00-4:15 Exploratory 4106 and streamed online

Textbook Partial Differential Equations. Lawrence Evans.

Instructor Matt Holzer, Exploratory Hall 4458

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Office Hours , TBA, F 10-11 by appointment

Course Description Many fundamental models are described by Partial Differential Equations (PDEs). This course is a graduate-level introduction to PDEs and the mathematical theory required for their study. To start, we will cover the basics of the transport, Laplace, heat and wave equations. Next we will study conservation laws, characteristics and shocks. We will touch briefly on Fourier transform methods. Significant attention will be given to the treatment of weak solutions and the use of functional analytic methods in their study. If time permits (which it likely will not), I will discuss some aspects of semi-group theory.

Prerequisites Mathematical maturity commensurate with graduate study. A familiarity with ODEs is useful, but not essential.

Safe Return to Campus If you plan to attend class in person at any time this semester please ensure that you have taken the safe return to campus training. Please do not attend class if you feel unwell or have been exposed to COVID. All lectures will be recorded and streamed online, so you won't miss anything by not attending. Those attending class in person are expected to wear a mask and practice social distancing. In the event that I feel unwell or have been exposed to COVID, then the course will be moved to an online format. All materials will be exchanged electronically, I will not accept paper homework submissions nor will I be giving out paper copies of assignments.

Recap/Reflection Assignments Each Monday a two page reflection is due. The point is to highlight the main concepts and examples studied during the previous week. The goal is not to regurgitate the lecture material, but to try and synthesize it and distill the main ideas.

Weekly homework assignments A homework assignment will be distributed every week. These problems will be due the following week. Some (most) of these problems will be graded on a check/rewrite/zero grade scale. A check counts as one point. A rewrite is zero, but the problem may be rewritten and resubmitted for full credit. A zero is a zero.

Final Project In lieu of a final exam you will be asked to study a topic related to PDEs and prepare a 15 minute presentation on the topic to be presented (virtually) during the Final Exam Period. You will choose your project topic mid semester.

Important Dates

Monday September 7th : Labor Day (no class)
Monday October 12th: Columbus Day (no class)
Tuesday October 13th: Monday class is held on Tuesday this week
Wednesday November 25th: Thanksgiving Holiday (no class)
Monday November 30th: course transitions to an entirely online format
Monday December 14th: Final Project Presentations

Grade Grades will be determined according to the proportion of points earned throughout the semester. Final grades will be given according to the standard breakdown (94 for an A, 90 for an A-, 87 for a B+, etc). I reserve the right to shift these gradelines lower, but they will not be raised.

Academic Integrity You are bound by the Mason Honor Code and its policies related to Academic Integrity. Violations will be taken seriously.

Disability Services Students may be eligible for accommodations through the Office of Disability Services

Communication All email communication is to take place through your gmu email account.