MATH 323, PARTIAL DIFFERENTIAL EQUATIONS WITH APPLICATIONS (IN THE AGE OF COVID) WINTER 2021-22

Overview: This course will introduce partial differential equations (PDEs) with applications. It will cover primarily analytical methods for solving PDEs, including the heat equation, the wave equation, Laplace's equation, and first order equations.

Course Objectives: By the end of this course, students should be able to interpret important PDEs with applications in physics and engineering, including the heat equation, wave equation, and Laplace's equation. Students should be able to solve these equations by separation of variables, eigenfunction expansion, and transform methods (Fourier and Laplace). Students will also learn the method of characteristics for solving first order PDEs, and Green's functions for solving elliptic equations.

Prerequisites: Math 210 or an equivalent course. Students should be comfortable with partial derivatives, series, and ordinary differential equations.

Format: For the first couple of weeks, all lectures will be via Zoom. The Zoom link is: https://drexel.zoom.us/s/85391913434
Zoom is NOT my preference, but it is the only way to run the class remotely.
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Instructor: Ron Perline (perlinrk@drexel.edu)
Office hours: TBA

Course Web Page: Course materials (syllabus, homework, solutions, *etc.*) will be either posted to the Blackboard website, or emailed directly to the class.

Textbook: *Partial Differential Equations for Scientists and Engineers* by Stanley J. Farlow. We will cover most of Chapters 1–4.

Other resources: The following textbooks cover much of the same material. They offer additional exercises and examples, along with alternative explanations of topics:

- *Applied Partial Differential Equations*, Haberman
- *Schaum's Outline of Partial Differential Equations*, DuChateau
- *Elementary Differential Equations and Boundary Value Problems*, Boyce & DiPrima

Homework: Homework will be assigned weekly, and discussed in the second hour of each Tuesday, and due the following Thursday. If this pace seems too fast we may make some assignments due every two weeks. YOUR GRADE FOR THE CLASS WILL BE BASED ON THESE HOMEWORK ASSIGNMENTS. Some of the homeworks will require careful writeups of the lectures from the previous weeks. THIS IS VERY GOOD WAY TO LEARN THE CLASS MATERIAL.

Homework (cont): The homeworks will be turned in via PDF format, mailed to me :

perlinrk@drexel.edu

This is not the same address as when I send out class mail.

PLEASE PLEASE PLEASE use the following format, it makes it MUCH easier for me to process the papers:

Subject: MATH-323-HOMEWORK-1-PERLINE-RON (put your name, not mine!)

Also, **the name of the pdf file should be the same as above.** PLEASE look at the pdf file before you send it to me: if you can't read the pdf file, I will not be able to either.

Grading Scale: Course grades of 90–100 correspond to a letter grade of A; 80–89 correspond to a letter grade of B; 70–79 correspond to a letter grade of C; 60–69 correspond to a letter grade of D; Below 60 corresponds to a letter grade of F. ± will be assigned at the instructor's discretion. A curve may be implemented at the instructor's discretion, but grades will never be curved down.

Academic Policies: Students should be familiar with the academic policies which can be found in the following places:
Academic integrity, plagiarism, and cheating policy:
`http://www.drexel.edu/provost/policies/academic_dishonesty.asp`
`http://drexel.edu/studentaffairs/community_standards/studentHandbook/general_information/code_of_conduct/`
Absence from Class:
`http://www.drexel.edu/provost/policyweb/absence.html`
Students with Disability Statement:
`http://www.drexel.edu/oed/disabilityResources/students/`
Course drop policy:
`http://www.drexel.edu/provost/policies/course_drop.asp`

Course change policy: In the event that there are any changes to the course syllabus, such changes will be communicated to students in class and through email.