Information Sheet for Math 430 Fall 2017

Class meets: MTRF 10:00 - 10:50 am in MH 114

Instructor: Branko Ćurgus **Office Hours:** BH 178 MTRF noon **Email:** curgus@wwu.edu

Course website: http://faculty.wwu.edu/curgus/Courses/430_201740/430.html

Text: *(Elementary) Applied Partial Differential Equations With Fourier Series and Boundary Value Problems* (3rd or 4th or 5th Edition) by Richard Haberman

Material covered. We plan to cover a selection of topics from Chapters 1, 2, 3, 4, 5, 7, 8, 10, 12 of the textbook.

Student Learning Outcomes: The successful student will demonstrate: (1) a geometric understanding of the method of characteristics, how to use it to solve quasi-linear first order PDEs and how to apply it to the one-dimensional wave equation to derive d'Alembert's formula; (2) a knowledge of the physical laws and mathematical facts used in derivation of the diffusion, heat and wave equation and an ability to use those laws and facts to derive those equations; (3) an understanding of the physical meaning and the role of boundary conditions for PDE, in particular Dirichlet, Neumann and mixed boundary conditions; (4) an ability to solve the wave, heat and Laplace equations in the one-dimensional setting via separation of variables for a variety of boundary conditions; (5) an ability to expand a (piece-wise smooth) function in its Fourier (sine, cosine, full, complex) series on a finite interval; (6) an understanding of the statements of convergence of Fourier series including when such series can be differentiated or integrated term by term to yield a convergent series; (7) an ability to use differentiation to apply the method of eigenfunction expansion to solve the heat and wave equations; (8) an ability to apply the method of separation of variables to the wave, heat and Laplace equations in higher dimensional settings, for example on a rectangle or a disk in the plane (in particular, an ability to derive these equations in polar coordinate system); (9) an understanding of the Fourier transform and its properties, as well as how to use it to solve the heat equation on infinite domains.

Exams. There will be two "mid-term" exams and a comprehensive final exam. The "mid-term" exams are scheduled as follows: Tuesday, October 24, 2017 and Tuesday, November 21, 2017. The final exam is scheduled for three hours on Tuesday, December 12, 2017 from 8 a.m. to 11 a.m. (Notice that the final exam time is set by the school. I did my best to copy it correctly from the schedule. Please verify that I did it right. However, I did extend the duration of the final exam to three hours.) On each exam I will assign two questions closely related to the theory and exercises presented in class and two exercises that are not so closely related to what is covered in class, but are related to the homework problems. There will be no make-up exams. If you are unable to take an exam for a very serious reason verified in writing, please see me beforehand.

Assignments. There will be two written homework assignments. The assignments will be handed out in class one week before they are due. These assignments will be graded and the grade will count towards the final grade.

Homework. Your daily homework should consist of studying the material covered in class. Sometimes my presentation in class I will differ from the presentation in the textbook. Study both: your class notes and the book. Analyze the similarities and the differences. This will help you to internalize the concepts and the methods that are being studied. Exercises in the book are there to enhance and challenge the learning process. Use them.

Grading. Each exam and assignment will be graded by an integer between 0 and 100. Your final grade will be determined using the following formula

$$\texttt{FG} = \lceil \texttt{0.2*E1 + 0.2*E2 + 0.1*A1 + 0.1*A2 + 0.4*FE} \rceil,$$

where `E1`, `E2` are the grades for the in-class exams, `A1`, `A2` are the grade on the assignments and `FE` is the grade for the final exam. In the above formula the symbol $\lceil x \rceil$ denotes the ceiling of a real number x. Your letter grade will be assigned according to the following table.

F : 0 - 49	D : 50 - 54	C− : 55 - 59	C : 60 - 64	C+ : 65 - 69
B− : 70 - 74	B : 75 - 79	B+ : 80 - 84	A− : 85 - 89	A : 90 - 100

Remarks. This is a fast-paced course. It is essential that you keep up with the material presented every day. Do the exercises at that I will assign on the class web-page. Look for help if you encounter difficulties.

Remember that the best way to learn mathematics is to discuss it with others: other students in this class, students that took this class before, and me. I will be glad to talk to you during my office hours, or you can make an appointment.

530 students will be assigned additional assignment problems which will require higher level of understanding of the material covered in class.