

Information Sheet for Math 430 and Math 530 Fall 2023

Class meets: MTRF noon - 12:50 pm in AW 303

Credits: four credits

Teacher: Branko Ćurgus, Professor of Mathematics

Office: BH 184A

Office Hours: MTRF at 1 pm or by appointment (in person or see the class [Canvas page](#) for a Zoom link)

Email: curgus@wwu.edu

Class website: http://faculty.wwu.edu/curgus/Courses/430_202340/430.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, 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.

Homework: Your daily homework should consist of studying the material covered in class. Sometimes my presentation in class will differ significantly 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. Almost every day, I will post something on the website.

Assignments: There will be two assignments during the class and the final assignment. The assignments during the class will be due not sooner than one week after they have been posted. I will post the final assignment before Thanksgiving Holiday and it will be due at 11:59 pm on Friday, December 15, 2023.

On Your Written Work: I hope it is not too much trouble for you to submit your assignments as pdf files electronically through Canvas Assignments. I cannot grade work submitted by email.

Please make sure that you produce a high-quality, readable pdf file of your work. \LaTeX is a free software designed for typesetting high-quality mathematical documents. I encourage you to learn \LaTeX and use it for your writing. If you submit your handwritten work, write neatly on paper with a light-colored background using a dark pencil or ink. Using a good scanning app to produce a high-quality is essential to creating a readable pdf file.

Since you will have enough time to work on the homework and assignments, your papers should be well-written. Presenting calculations alone without the context in which they occur and without explanations of your reasoning is not sufficient for the full credit. I believe that writing mathematics in complete sentences organized in meaningful paragraphs enhances the learning process. As a guide for writing, you can use examples in the textbook or my writing on the class website.

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

$$FG = \lceil (A1 + A2 + A3)/3 \rceil,$$

where A1, A2, A3 are the grades for the assignments. Your letter grade will be assigned according to the following table.

F	: 0 - 39	D-	: 40 - 44	D	: 45 - 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

Technology: I believe that mathematical explorations enhance learning mathematics. In this class, for mathematical explorations, we will use the computer algebra system *Mathematica* version 12, which is available on many campus computers, in particular in BH 215. I will provide ample information on how to use *Mathematica* and welcome questions about it during my office hours. Each assignment will have a *Mathematica* part. To get started with *Mathematica* read my webpage [Mathematica at WWU](#).

How to succeed: Attend classes regularly and do all the suggested homework problems. Read the book before each class and ask questions if there is anything that is not clear. Keep organized notes of all your work. Make sure that you *fully understand* how to do each assigned problem. Do not hesitate to ask questions whenever something does not make sense.

Diversity, Equity, Inclusion: Welcome to my class. I promise to keep my mind open to the mathematical experiences you bring to this class. I want to help you use those personal experiences creatively to build your own understanding of the material studied in this class. I will bring diverse approaches to most concepts. I understand that each of you comes to this class with a different mathematical background. Please let me know if you are unsatisfied with your understanding of a particular topic, which is a prerequisite for this class. We can meet outside of class and discuss that topic and find some study material for you. The goal is to create an environment where you can succeed in this class and be proud of your achievements.

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

Academic Honesty Policy: Academic dishonesty is not tolerated at Western Washington University. Representing the work of another as one's own is an act of academic dishonesty. For a full description of the academic honesty policy and procedures at Western, see [Appendix D](#) in the University Catalog.

Flexibility Statement: This syllabus is subject to change. Changes, if any, will be announced in class or online. Students will be held responsible for all changes.

Syllabi@WWU: Please go to <https://syllabi.wvu.edu/> where you will find Syllabi Policies for Students and Campus Resources for Students

The Branko Ćurgus Mathematical Experience: Mathematics has always been a personal experience for me: **The Branko Ćurgus Mathematical Experience**. I want to create an environment where you can embrace mathematics as your personal experience. How can this be achieved? Begin by acknowledging what you don't understand without fear. Discuss challenges openly with others. Open your mind, ask questions. Generously share your questions with others like precious gems. Questions are the gateway to deeper comprehension. Indeed, questions serve as a bridge from confusion to clarity.