Partial Differential Equations

MATH 4373.001 | Fall 2020

Instructor: Dr. Deborah Koslover
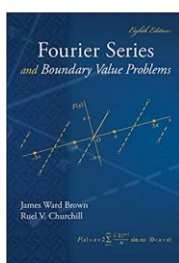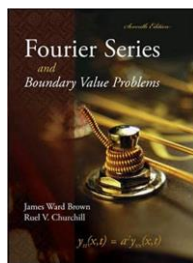
Office: RBN 4010

Email: dkoslover@uttyler.edu

Classroom: RBN 3039

Meeting Time: MWF 1:25 – 2:20 PM

PDE Office Hours: Th 4-5 PM, F 11-12 AM or by appointment. 2:40-3:40 M for all my classes

Course Description

In this course we will develop the mathematical ideas needed to solve problems in the physical sciences, using partial differential equations. Surprisingly, you will find that you already know much of the background. We will look at mathematics that you have already seen and interpret it in new ways. This will allow us to solve problems in heat conduction and wave propagation. We will study Laplace's equation, separation of variables (a new type, not the type you've see in ODEs) and transform methods to solve boundary value problems. We will also develop Sturm-Liouville Theory. Prerequisites: MATH 3305, MATH 3203 or MATH 3315, and MATH 3404.

Textbook

Fourier Series and Boundary Value Problems, 7th or 8th edition, by Churchill, McGraw Hill 2008 or 2012. 7th ISBN-13: 978-0073051932 ISBN-10: 0073051934   8th ISBN-13: 978-0078035975 ISBN-10: 007803597X
The math department will loan you copies of one of these books. You do not need to buy one unless you want.

Website

You will be using Canvas. Go to www.uttyler.edu/canvas to log into Canvas using your regular patriots account. If you have enrolled in the course, you should have access to the website. You will find important documents, grades, lecture notes, and announcements on Canvas.
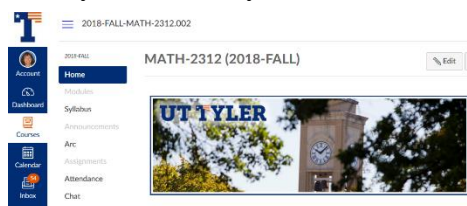
Attendance is mandatory and attendance records will be kept. Notify Dr. Koslover in advance if you must miss a class, be late for a class or leave early. (Official University Policy: Class attendance is the responsibility of the student. When a student has a legitimate absence, the instructor may permit the student to complete missed assignments. In many cases class participation is a significant measure of performance, and non-attendance may adversely affect a student's grade. When a student's absences become excessive, the instructor may recommend that the student initiate a withdrawal.)

Learning Outcomes

At the conclusion of this course, you will be able to

1. Define orthogonal and orthonormal sets, eigenvalues and eigenfunctions, superposition of solutions, Gibbs phenomena, boundary value problems, Gamma functions, Bessel functions and Legendre polynomials.

2. Find Fourier series, determine when they converge and understand their properties.

3. Use separation of variables to solve partial differential equations.

4. Interpret the solutions of boundary value problems with emphasis on problems from physics involving heat, vibration and potential.

5. Solve Sturm-Liouville problems as they arise in physics This includes appropriately choosing appropriate coordinate systems, and understanding and using Fourier series, Bessel functions and Legendre polynomials.
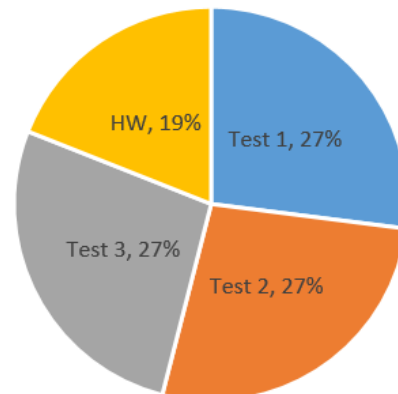
Course Evaluation

At the end of the semester, you will find your final grade on my.uttyler.edu. It will also be posted on Canvas.

A final course grade of

90% is guaranteed to be at least an A
80% is guaranteed to be at least a B
70% is guaranteed to be at least a C
60% is guaranteed to be at least a D.

All grades below 60% will be F.

HW, 19%   Test 1, 27%
Test 3, 27%   Test 2, 27%

The Plan

Homework (19%) will be assigned daily. Assignments will appear on Canvas. A small number of problems will be assigned each day and will be due at the beginning of class the following day. We will start each class with a discussion of the homework problems. This discussion will be a significant part of your grade. You need to be prepared to either present your solution or ask questions. I will then collect the problems and will grade them for completion. The final week of classes a larger set of problems will be assigned. These will be due during finals week on Thursday at 5 PM. These will be grade

properly and will constitute a 20% of your homework grade. If you cannot attend class, scan your homework (don't photograph it) and post it on Canvas.

TESTS There will be three tests (20% each). These exams will test your knowledge of the material taught in the class and practiced on the homework. Test problems will be similar to homework problems, but generally shorter. The final exam will be comprehensive, but will emphasize material in the final third of the course. . If you cannot be in class for a test, you must notify me in advance and schedule a Zoom oral test to take place within a few days of the scheduled test. The oral test will be different from the class quiz. With a doctor's note, you can makeup tests more than a few days late.

    Test 1: Friday, Sept 18   **Test 2**: Friday, Oct 16 **Test 3**: Friday, Nov 20

Final Exam: There will be no final exam

Make-ups

Make-ups for **documented** absences that are **required** as part of a UT Tyler obligation (e.g. athletes participating in an event, participating in a debate contest, etc.) or for religious observation will be granted. For all make-ups of this type, prior notification of at least one week and documentation are required. Other make-ups are granted only in extreme cases such as hospitalization and at the sole discretion of the instructor.

"NOW KISS AND MAKE UP."

Other Details
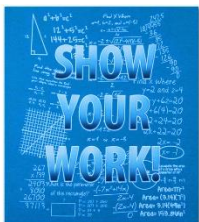
 Calculator Policy: Non-graphing calculators may be used on tests. You may not use your phone. However, all work must be shown.

Cell phones, IPODs and other electronic devices: Please set your cell phones and pagers to silent mode. If you are expecting an emergency call, please notify the instructor in advance, sit near the door, and answer the phone outside. You will not be allowed to wear an IPOD or other electronic devices during an exam. During tests, cell phones must be turned off and placed in sight on your desk.

Covid Related Issues

Please follow the university required policies including wearing a mask in class and staying home if you are sick. Face coverings are required by Texas Executive Order GA 29. Those with medical conditions are exempted, but I would appreciate if you would share with me that you fall in this category.

Let me know if you will be missing class, before class if possible. If you are only mildly ill, or not ill but quarantined, attend class via Zoom.

If we have class cancellations or if the university gets shut down, I may move test or quiz dates. I will email you and post an announcement on Canvas in these circumstances. If we must hold a test remotely, it will, at least partially, be an oral test. The oral part of the exam will be worth most of the points.

You will need a camera and a microphone to take any oral quiz or exam. I must be able to see your face during the exam. Your phone will work, but it will be easier for you if you can use your computer.

If you have any special concerns, problems or other issues, please let me know as soon as possible so that we can craft solutions.

Disability/Accessibility Services:

The University of Texas at Tyler has a continuing commitment to providing reasonable accommodations for students with documented disabilities. Like so many things this Fall, the need for accommodations and the process for arranging them may be altered by the COVID-19 changes we are experiencing and the safety protocols currently in place. Students with disabilities who may need accommodation(s) in order to fully participate in this class are urged to contact the Student Accessibility and Resources Office (SAR) as soon as possible, to explore what arrangements need to be made to ensure access. During the Fall 2020 semester, SAR will be conducting all appointments via ZOOM. If you have a disability, you are encouraged to visit https://hood.accessiblelearning.com/UTTyler and fill out the New Student Application. For more information, please visit the SAR webpage athttp://www.uttyler.edu/disabilityservices or call 903.566.7079.

Important Covid-19 Information for Classrooms and Laboratories
Students are required to wear face masks covering their nose and mouth, and follow social distancing guidelines, at all times in public settings (including classrooms and laboratories), as specified by Procedures for Fall 2020 Return to Normal Operations. The UT Tyler community of Patriots views adoption of these practices consistent with its Honor Code and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff.

Students who are feeling ill or experiencing symptoms such as sneezing, coughing, or a higher than normal temperature will be excused from class and should stay at home and may join the class remotely. Students who have difficulty adhering to the Covid-19 safety policies for health reasons are also encouraged to join the class remotely. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email saroffice@uttyler.edu.

Recording of Class Sessions
Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.

Calendar

AUGUST

MON	WED	FRI
24	26	28
First Day		
31		

December 7 Study Day

Final Homework Assignment Due Dec 10 5 PM.

SEPTEMBER

MON	WED	FRI
	2	4
		Census date
7	9	11
Labor Day		
14	16	18
		Test 1
21	23	25
28	30	

OCTOBER

MON	WED	FRI
		2
5	7	9
12	14	16
		Test 2
19	21	23
26	28	30

NOVEMBER

MON	WED	FRI
2	4	6
Drop Day		
9	11	13
16	18	20
		Test 3
23	25	27
Thanksgiving		
30	Dec 2	Dec 4
Online	Online	Online