

Math 3150-003: Partial Differential Equations for Engineers. *Spring 2018*

Instructor Alexander Balk
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Office Hours: Tue, Thu 11-12, or by appointment

Time and Place MWF, 11:50-12:40, WEB 2250

Text *Applied Partial Differential Equations with Fourier Series and Boundary Value Problems* (5-th ed.)
by **Richard Haberman** (Chapters 1-4 and 10)
These five chapters are re-printed in the
Custom Edition for the University of Utah: Linear Algebra & Differential Equations
with ***Introductory Partial Differential Equations and Fourier Series*** (Chapters 12-16)
You can choose either the Custom Edition or the PDE textbook.

Grading Policy

The grade for the class will be based on

- (1) Weekly Homework (HW), usually due on Fridays — **10%**
(1 lowest score will be dropped)
- (2) Weekly quizzes (Qz), 20 min in the beginning of class usually each Friday — **50%**;
(1 lowest score will be dropped)
- (3) One 50 min midterm (M)— **15%**;
- (4) Comprehensive final (F) — **25%**.

The (approximate) scale for total grade (%):

A (95-100),	A- (90-94),
B+ (85-89),	B (80-84),
C+ (70-74),	C (65-69),
D+ (55-59),	D (50-54),
	D- (45-49),
	E (0-44).

Dates	Martin Luther King Jr. Day holiday	Mon, Jan 15
	Presidents Day holiday	Mon, Feb 19
Midterm		Fri, Feb 23 ; in class
Spring break		Sun-Sun, March 18-25
Last Class		Mon., April 23
Final		Thu, April 26, 10:30 — 12:30 in the regular room (according to the university schedule)

Course Objectives.

1. To understand the meaning of PDEs and boundary conditions. To see that many real world problems can be formulated in terms of PDEs. To know how to derive the heat, wave, and Laplace equations.
2. To learn how to solve PDEs using the *method of separation of variables*. This method is the cornerstone of the course. It is connected with the *Superposition Principle*, and the *Fourier Series*.
3. To learn the Fourier transform and how to apply it in order to solve PDEs.

To demonstrate what we have learned, at the end of the class we will consider cooling of a potato and cooling of the Earth (how Lord Kelvin tried to determine the age of the Earth). These are mathematically similar problems, but the parameters and the solution methods are different.

(over, please)

HW assignments will be posted on **Canvas**.

The first quiz is on the first Friday. The first HW is due the second Friday.

The midterm/final problems will be **similar** to the HW problems and to the Qz questions.

The Qz questions will be similar to the ones considered in lectures or in homework.

You need to solve the test problems (in quizzes, midterm, and final) **without books, notes, or electronics** (e.g. without lecture notes, your own notes, computer, cell phone, or calculator).

For any problem, just the correct answer (without derivation or explanation) costs nothing. And vice versa, the incorrect answer (e.g. resulting from an arithmetical mistake at the end of your solution) might give you 100%.

The quizzes are designed to check your basic understanding. If you are below perfect on quizzes, you probably have missed something and need to re-learn this quickly (otherwise, you might waste some of your time during lectures, unable to follow them).

If something is unclear, please **ask** me right away. Otherwise, small misunderstanding can cause significant problems later. I would be very happy to discuss your questions. You can ask me during lectures (others might have similar problems, and in-class discussion would be helpful), after lectures, during office hours, or make an appointment. Discussions with fellow students can also be very helpful.

Take into account that it is one thing to follow and completely understand a **given** solution, but it is a **very different thing** to solve the problem by yourself. It is very important that you solve HW problems (even if solution is available to you). HW makes a significant **indirect** contribution to the final grade. Besides the assigned HW problems, you might want to do similar problems.

T. Benny Rushing Mathematics Center

(between LCB and JWB, <http://www.math.utah.edu/undergrad/mathcenter.php>) provides free tutoring in math courses. Only some of the tutors can help with Math 3150; check the schedule on the web site (before going there).

The Americans with Disabilities Act requires that reasonable accommodations be provided for students with physical, sensory, cognitive, systemic, learning, and psychiatric disabilities.