MATH 39100-B (18700): Methods of Differential Equations, Fall 2025

Instructor

Jeremy Weissmann
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Schedule

Days: Monday, Wednesday
Time: 9:30–10:45 AM
Room: NAC 5/110

We **do not** have class on the following days:

September: 1 (Monday), 22 (Monday), 24 (Wednesday)
October: 1 (Wednesday), 13 (Monday), 20 (Monday)

We **do** have class on these days, which follow a **Monday** schedule:

October: 14 (Tuesday), 24 (Friday)

Finals week begins Tuesday, December 16th.

Textbook

Elementary Differential Equations and Boundary Value Problems
by William E. Boyce, Richard C. DiPrima, and Douglas B. Meade

I will be using the 12th edition. I've heard that the 9th, 10th, and 11th editions are fine, or possibly better; just make sure that *Boundary Value Problems* is in the title.

Chapter 2	*First-order equations*	2.2, 2.1, 2.6, 2.3, 2.9
Chapter 3	*Second-order equations*	3.2, 3.1, 3.3, 3.4, 3.5, 3.6, 3.8, 3.9
Chapter 4	*Higher-order equations*	4.1, 4.2, 4.3
Chapter 5	*Series solutions*	5.1, 5.2, 5.3, 5.4, 5.5, 5.6
Chapter 6	*The Laplace transform*	6.1, 6.2
Chapter 10	*Partial differential equations*	10.1, 10.2, 10.3, 10.4, 10.5

Additional resources

The class documents will be available on my page here:

https://math.sci.ccny.cuny.edu/person/jeremy-weissmann/

The Supervisor for Math 391 is Professor Ethan Akin. He will be posting slides on his website that may be of interest:

https://math.sci.ccny.cuny.edu/person/ethan-akin/

I strongly recommend you use Desmos (desmos.com) or something similar to graph solution curves. For graphing slope fields, I've found the following website helpful:

https://homepages.bluffton.edu/~nesterd/apps/slopefields.html

Homework, tests, and grades

60% — three in-class tests
40% — final exam

Homework will not be collected or graded. Class time will be devoted to solving homework problems and others like them.

The tests will be created from the homework. Do the homework problems over and over until you can get the right answer easily: *If you can do the homeworks, you will do well on the tests; if you cannot do the homeworks, you will not do well on the tests.*

Don't wait to get help if there's something you don't understand!

Finally, there are **no makeups**. If you miss work with a legitimate reason, the remaining work will be weighted more heavily.

Departmental course information

COURSE LEARNING OUTCOMES

After taking this course, the student should be able to:	Contributes to Departmental Learning Outcome(s):

1. Solve a variety of first order differential equations selecting from a variety of techniques covered in the syllabus.	a. b, e2, g
2. Likewise, solve a variety of second order differential equations, selecting from several techniques covered in the syllabus.	a, b, e2, g
3. Be able to analyze certain physical problems (tank flow, compound interest, mechanical and electrical vibration), set up their determining differential equations, solve them using the techniques in 1. and 2. above, and use these solutions to answer questions about the physical system.	a, b, c, g
4. Give series solutions (and approximations) for second order linear differential equations, both at ordinary points and at regular singular points.	a, b, g
5. Have a fundamental understanding of Fourier series and be able to give Fourier expansions of a given function.	a, b, e1, e2, g
6. Understand and be able to apply all the mathematical aspects that contribute to the solution of heat conduction of a rod problem with constant temperature boundary conditions (the method of separation of variables, the use of Fourier series, as well as the specific solution).	a, b, c, g
7. Understand and be able to use various theoretical ideas and results that underlie the mathematics in this course covered in the syllabus (including various existence/ uniqueness results, ideas of linear independence and the Wronskian, and convergence properties of Fourier series).	e1, e2, g

COURSE ASSESSMENT TOOLS

1. The average of class examinations: 60% of grade
2. Comprehensive written final exam: 40% of grade.

DEPARTMENTAL LEARNING OUTCOMES

The mathematics department, in its varied courses, aims to teach students to:

a. perform numeric and symbolic computations
b. construct and apply symbolic and graphical representations of functions
c. model real-life problems mathematically
d. use technology appropriately to analyze mathematical problems
e. state (e1) and apply (e2) mathematical definitions and theorems
f. prove fundamental theorems
g. construct and present (generally in writing, but, occasionally, orally) a rigorous mathematical argument.