

MATH 39100K (19535) - **Methods of Differential Equations**

Fall, 2026 Tuesday, Thursday 8:00 – 9:15 am MR 02

Book: *Elementary Differential Equations and Boundary Value Problems*, 12th Edition, by William E. Boyce, Richard C. DiPrima and Douglas B. Meade [The 11th Edition or the 10th Edition or 9th Edition by Boyce and DiPrima are fine, are even preferred, but 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 3,4 higher order equations: 3.2, 3.1, 3.3, 3.4,
3.5, 3.6, 3.8, 3.9, 4.1, 4.2, 4.3.

Chapter 5 series solutions: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6.

Chapter 6 Laplace transforms: 6.1, 6.2

Chapter 10 partial differential equations: 10.1, 10.2, 10.3, 10.4, 10.5

The classes will use slides that I have prepared. These slides will be posted on my personal website:

profakin.webflow.io

Notice this is a personal site. It is not part of the Math Dept website. (To download a pdf using a PC, click on the link->right click to “save link as”->save. Just clicking on the original link should open the pdf. On a phone you should also be able to download.)

Also posted there will be this class information document and the syllabus with the list of homework problems from the book. The due dates are recommendations as I will not be collecting homework, although I will go over problems in class.

Grading: There will be three in-class tests during the term. The term average, which will count for 60% of the grade, will be computed from these. The final exam will count the remaining 40% of the grade. You should be warned that there are no makeups. If you have missed work with a legitimate reason, the remaining work will simply be counted more heavily.

It is a good idea to work with others, collaborating on studying, doing homework and preparing for tests. On the internet you will find treatments of differential equations that you may find to be helpful, e.g. the Kahn Academy. Of course, such collaboration and internet browsing during a test would be cheating. I hope that you will engage with the course in an honorable fashion.

Office Hours: Tuesdays, Thursdays 10:00am-12:00.

Office: Marshak 325 Phone: 650-5136

Ethan Akin, Mathematics Department, Email: eakin@ccny.cuny.edu

Academic Integrity Policy

The tests and final exam are subject to the academic integrity policies of this course and of The City College of New York.

No reference to notes or a text is allowed during the test. All electronic devices are strictly prohibited during the examination, including, but not limited to, mobile phones, smartwatches, earbuds/headphones, tablets, or any other device capable of communication, computation, or storage of information, unless explicitly authorized by the instructor. All such devices must be turned off and stored in accordance with the instructions provided by the instructor or proctors. You may not access, handle, or attempt to use any unauthorized device at any point during the examination, including during any permitted breaks (e.g., restroom use). Reference to unauthorized written material is a violation of test rules. Possession or handling of an unauthorized electronic device during the examination constitutes a violation of test rules, regardless of whether the device is on or actively used.

Any such violation will result in an immediate score of zero on the test and may be referred to the Academic Integrity Committee for further disciplinary action, which may lead to additional sanctions.

If you are uncertain whether a particular item or behavior is permitted, it is your responsibility to seek clarification from a proctor before or during the examination, prior to any potential violation.

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.