

Differential Equations

MATH 23 — Fall 2026

Instructor Information

Trevor Camper, Ph.D.

Email: trevor.camper@dartmouth.edu

Office: Kemeny Hall 209

Office Hours: Monday/Wednesday 11:30am–12:30pm, or by appointment.

Meeting Time & Location

Unless otherwise announced, this section meets in-person on MWF from 10:10am–11:15am in Kemeny 004. The X-hour will be on Thursdays from 12:15pm–1:05pm, and will only be held to administer quizzes or at the discretion of the instructor.

Course Description

This course is a survey of important types of differential equations, both linear and nonlinear. Topics include the study of systems of ordinary differential equations using eigenvectors and eigenvalues, numerical solutions of first and second order equations and of systems, and the solution of elementary partial differential equations using Fourier series.

Textbook

Elementary Differential Equations and Boundary Value Problems (11th Edition) by Boyce & DiPrima, Wiley 2017. It is fine to use the 9th or 10th edition. The problems may differ at the end of each section, but the content is primarily the same. You may find online versions of some older editions.

Communication

Important information may be communicated via email, Canvas, or in-class announcements. You are responsible for any information announced in class, through email, or through Canvas. If at all possible, please do not message me through Canvas – email me at trevor.camper@dartmouth.edu. Any email received **after 9:00pm** will receive a response the next business day.

In-Class Conduct

All students and instructors are entitled to a learning environment that is free of unnecessary distractions. Please, no conversations during instruction. If discussing course content during instruction with another student, please keep a low voice. Please do not work on homework or other coursework while in class. Please remove earbuds, headphones, and AirPods during class. The use of a laptop, tablet, or cell phone should be restricted to relevant class activities.

Attendance

Attendance is a critical component of academic success and it is expected that you attend every class. *This is a difficult course to pass if you are not attending.* If you're not able to come to class, please send me an email so that I'm aware. Excessive, unexplained absences may result in being dropped from the course.

Grading Structure

Your final grade will be calculated on the following basis.

Midterms	60.00%	Two midterm exams will be administered on the following days: October 5 and November 6 . These exams are weighted equally, i.e. 30.00% each.
Final Exam	20.00%	A cumulative final exam is scheduled for Tuesday, November 24 , from 3:00pm – 5:00pm . Note: The final exam must be taken at the scheduled time and date. Do not make any end-of-semester arrangements (travel, move-out, etc.) that may conflict with this.
Problem Sets	8.00%	Problem sets will be posted periodically to Canvas.
Classwork	12.00%	Short in-class quizzes will be given to reinforce the material from the homework and lectures.

The grade scale is as follows:

- A : 93%–100%
- A- : 90%–92.9%
- B+ : 87%–89.9%
- B : 83%–86.9%
- B- : 80%–82.9%
- C+ : 77%–79.9%
- C : 73%–76.9%
- C- : 70%–72.9%
- D : 60%–69.9%
- E : Below 60%

Please note: The non-examination components do not reliably forecast the final course grade.

Make-Ups & Late Work

In general, I do not allow make-ups or accept late work. Note that there are several assignments that are dropped at the end of the term. Please contact me in a timely manner to request any dispensation from my usual policy.

Course Schedule

Below is a tentative course schedule:

Lecture	Topics/Sections	Homework/Exams
Mon, Sep 14	1.1–1.3 : Introduction; Mathematical Models; Solutions to some Differential Equations; Classification	
Wed, Sep 16	2.1 : Linear first-order Differential Equations	
Fri, Sep 18	2.2/2.4 : Separable equations; Existence-Uniqueness Theorems	PS 1 Assigned: Sections 1.1–2.1
Mon, Sep 21	2.3 : Modeling with Differential Equations	
Wed, Sep 23	2.5 : Autonomous equations and population dynamics	
Thurs, Sept 24	Quiz 1	
Fri, Sep 25	2.6 : Exact Equations	PS 1 Due, PS 2 Assigned: Sections 2.2–2.5
Mon, Sep 28	3.1/3.2 : Second order, constant-coefficient equations with distinct roots; the Wronskian	
Wed, Sep 30	3.3 : Complex Characteristic Roots	
Thurs, Nov 1	Quiz 2	
Fri, Oct 2	3.4 : Repeated roots and reduction of order	PS 2 Due, PS 3 Assigned: Sections 2.6, 3.1–3.3
Mon, Oct 5	Midterm 1: 6pm	
Wed, Oct 7	3.5 : Nonhomogeneous equations – Method of Undetermined Coefficients	
Thurs, Oct 8	Quiz 3	
Fri, Oct 9	3.6 : Nonhomogeneous equations – Variation of Parameters	PS 3 Due
Mon, Oct 12	7.1/7.3 : Review of matrices; Systems of ODEs	
Wed, Oct 14	7.3 : Linear Algebra and Eigenvectors; Systems of ODEs	
Fri, Oct 16	7.4 : Existence and uniqueness of solutions of systems of ODEs	PS 4 Assigned: Sections 3.4–3.6, 7.1–7.5
Mon, Oct 19	7.5 : Constant coefficient systems with real eigenvalues	
Wed, Oct 21	7.6 : Constant coefficient systems with complex eigenvalues	
Thurs, Oct 22	Quiz 4	
Fri, Oct 23	7.7 : Fundamental Matrices	PS 4 Due, PS 5 Assigned: Sections 7.6–7.9
Mon, Oct 26	7.8 : Repeated Eigenvalues	
Wed, Oct 28	7.9 : Nonhomogeneous Linear Systems	
Thurs Oct 29	Quiz 5	
<i>(continued on next page)</i>		

<i>(continued from previous page)</i>		
Lecture	Topics/Sections	Homework/Exams
Fri, Oct 30	9.1/9.2 : The Phase Plane and Autonomous Stability	PS 5 Due, PS 6 Assigned: 9.1–9.3
Mon, Nov 2	9.3 : Locally Linear Systems	
Wed, Nov 4	9.4 : Competing Species	PS 6 Due
Thurs, Nov 5	Quiz 6	
Fri, Nov 6	Midterm 2: 6pm	
Mon, Nov 9	9.5 : Predator-Prey Equations	PS 7 Assigned: Sections 9.4/9.5
Wed, Nov 11	6.1/6.2 : Laplace Transform and Initial Value Problems	
Thurs, Nov 12	Quiz 7	
Fri, Nov 13	6.3 : Step functions	PS 7 Due, PS 8 Assigned
Mon, Nov 16	6.4/6.5 : Discontinuous forcing functions; impulse functions	
Wed, Nov 18	6.6 : The convolution integral	PS 8 Due
Thurs, Nov 19	Quiz 8	
Tue, Nov 24	Final Exam	

Exams & Academic Accessibility

Students with learning, physical, or psychiatric disabilities enrolled in this course that may need disability-related classroom accommodations are encouraged to make an office appointment to see your instructor before the end of the second week of the term. All discussions will remain confidential, although the Student Accessibility Services office may be consulted to discuss appropriate implementation of any accommodation requested. At such a meeting please provide your instructor with a copy of a disability registration form, which lists the accommodations recommended for the student by Student Accessibility Services within the Academic Skills Center. The person you might want to contact at the Academic Skills center is Alison May, Director of Student Accessibility Services 205 Collis Center - (603) 646-9900.

Academic Calendar

Please refer to the Fall 2026 Academic Calendar (linked in Canvas) for important dates and deadlines.

Student Religious Observation

Some students may wish to take part in religious observances that fall during this academic term. Should you have a religious observance that conflicts with your participation in the course, please come speak with your instructor before the end of the second week of the term to discuss appropriate accommodations.

Prepared by Trevor Camper. *Last revised: September 13, 2026.*