

Course Syllabus: MATH 17 – Differential Equations and Linear Algebra

MATH 17-55028

100% Online

Instructor: Mr. Steven Zook

Phone: (559) 638-3641 ext. 3279

Office Hours: TTh 10am-12pm, W 9-10am

Reedley College

Spring 2021

Email: steven.zook@reedleycollege.edu

Office: FEM 4A

[Virtual Office](#)

Meeting Days:

Tuesday 1:00 – 1:50 pm, Zoom (links in Canvas)

Course Description: Solutions to first order ordinary differential equations, including separable, linear, homogeneous of degree zero, Bernoulli and exact with applications and numerical methods. Solutions to higher order differential equations using undetermined coefficients, variation of parameters, and power series, with applications. Solutions to linear and non-linear systems of differential equations, including numerical solutions. Matrix algebra, solutions of linear systems of equations, and determinants. Vector spaces, linear independence, basis and dimension, subspace and inner product space, including the Gram-Schmidt procedure. Linear transformations, kernel and range, eigenvalues, eigenvectors, diagonalization and symmetric matrices.

Course Prerequisites: MATH 6

Course Advisories: Eligibility for ENGL 1A

Student Learning Outcomes:

Upon completion of this course, students will be able to:

1. Use matrices and their applications to solve linear systems of equations.
2. Perform matrix computations, solve linear systems of equations and determine the bases of related vector spaces, find eigenvalues and eigenvectors, and diagonalize matrices when applicable.
3. Find the solutions to first order and higher order differential equations and apply them to various application problems.
4. Find the solutions to systems of differential equations using eigenvalue/eigenvector matrix methods.
5. Use Laplace transforms to find the solution to initial value problems.

Student Learning Outcomes are statements about what the discipline faculty hope you will be able to do at the end of the course. This is NOT a guarantee: the ultimate responsibility for whether you will be able to do these things lies with you, the student. In addition, the assessment of Student Learning Outcomes is done by the department in order to evaluate the program as a whole, and not to evaluate individual faculty performance.

Objectives:

In the process of completing this course, students will:

1. Create and analyze mathematical models using ordinary differential equations;

2. Verify solutions of differential equations;
3. Identify the type of a given differential equation and select and apply the appropriate analytical technique for finding the solution of first order and selected higher order ordinary differential equations;
4. Apply the existence and uniqueness theorems for ordinary differential equations;
5. Find power series solutions to ordinary differential equations;
6. Find solutions of systems of equations using various methods appropriate to lower division linear algebra;
7. Determine the Laplace Transform and inverse Laplace Transform of functions and use the Laplace Transform method to solve linear initial value problems.
8. Solve Linear Systems of ordinary differential equations using eigenvalue/eigenvector methods.
9. Use bases and orthonormal bases to solve problems in linear algebra;
10. Find the dimension of spaces such as those associated with matrices and linear transformations;
11. Find eigenvalues and eigenvectors and use them in applications;
12. Prove basic results in linear algebra using appropriate proof-writing techniques such as linear independence of vectors; properties of subspaces; linearity, injectivity and surjectivity of functions; and properties of eigenvectors and eigenvalues.
13. Use appropriate technology to enhance understanding of differential equations and linear algebra.

Required Text:

Edwards, C. Henry, et al., Differential Equations & Linear Equations, Pearson, 4th Edition, 2018. This text is required for reading, study, and homework.

Office Hours:

I will be holding regular virtual office hours. I want to be available to you if you need assistance outside of class. Please visit me during the scheduled times for drop-in questions. You may come unannounced during those times. If the scheduled office hours do not suit your schedule, you may arrange a time to meet with me by sending me an email. Please don't hesitate to take advantage of these since I want you to succeed – it's what I am here for.

This semester all my office hours are virtual at the following link: [Virtual Office](#)

Communication:

There are a variety of ways to reach me. I will do my best to respond to messages and emails that are received Monday-Friday between 9am and 5pm as soon as possible, but no later than 24 hours. If you don't hear back from me in 24 hours, assume I did not receive your message/email and please resend it. On weekends, please give me additional time - I will respond to messages/emails received over the weekend (after Friday 5pm) on Monday mornings. Please identify yourself in the email with your full name and course number (e.g. Steven Zook, MATH 11-55014).

Preferred:

1. Message me using the "Inbox" feature in Canvas.

2. Email me directly: steven.zook@reedleycollege.edu
3. Drop by my virtual office (zoom) during my scheduled office hour: [Virtual Office](#)
4. Consider posting a general course question in the Q&A discussion thread on Canvas.

Other:

5. Visit me in my office: FEM 4A (on hold until it is safe to be in my office and have visitors)
6. Call me on my office phone: 559.638.3641 extension 3279. If leaving a message, please let me know your full name and the course you are taking along with a call-back number.

Attendance and Drop Policy:

The primary way that you "attend" class is by participating in class discussions and completing assignments (homework, quizzes, and exams). It is important that students regularly and consistently participate in the course from the very beginning. For this reason I have the following guidelines for when I may drop students from the course. If I intend to drop you, I will always message you a warning before I do, so don't be anxious about being dropped "out of the blue". If you do have missing assignments, I encourage you to reach out to me, so we can make a plan to get you on track - the sooner the better!

1. Introduce yourself to me and to your classmates by participating in the **Introduction discussion** during the first week. Otherwise, I may drop you as a "no-show".
2. Start strong! Complete **all assignments** during the first two weeks of class. If you miss an assignment during the first two weeks, I may drop you from the course.
3. If you miss **more than eight (8) assignments** (discussion, quiz, homework, exam, etc.) during the first 9 weeks of the semester, I may drop you from the course for poor attendance.

Drop Deadline: Friday, March 12

Assignments:

1. Homework assignments can be worked on any time before they are due. I will accept late homework; however, I automatically deduct 10% for each day after the due date that the assignment is late. So, an assignment that is 10 or more days late will not receive credit ($10 \times 10\% = 100\%$ penalty).
2. Discussions will not be accepted late. Your classmates depend on your thoughtful, consistent, and timely participation.
3. Quizzes will be accepted late with a 50% penalty. A quiz that is more than one week late will not receive credit.
4. Exams cannot be made up late for any reason. However, to safeguard against any unavoidable and unforeseen circumstances, I drop the lowest exam score. I do allow you to take an exam early, if it is prearranged.

Assignment Categories and Weighting:

<i>Assignment</i>	<i>Weighting</i>
Online Homework	10%
Discussions	10%
Chapter Tests (8 @ 10% each)	80%

Final Grades

<i>Letter Grade</i>	<i>Percent</i>
A	90-100
B	80-89
C	70-79
D	60-69
F	0-59

Special Needs Requests:

If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact me as soon as possible.

Plagiarism and Academic Honesty:

Please refer to the policies in the Reedley College catalog, pages 47, 48. Academic honesty is of utmost importance and the college policies will be followed.