Longwood University
Spring 2023
Math 362-01 (30103)
Differential Equations
TR 9:30 AM – 10:45 AM, Rotunda 352

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Office Hours: My office hours are Mondays from 10:00 AM to 12:00 PM, Tuesdays and Thursdays from 11:00 AM to 12:00 PM, and Fridays from 10:00 AM to 11:00 AM. Appointments can also be arranged, if necessary. If you cannot make one of the scheduled times, send me an email or talk to me after class to set up an appointment.

Course Description: A study of ordinary differential equations (ODEs) of the first and second order, to include basic graphical, numerical, and analytic solution techniques, series solutions, eigenvalues and eigenvectors, and some applications to physics. *3 credits.*

Prerequisites: MATH 262 with a C- or better.

Student Learning Outcomes: By the end of the course, students will be able to:

- apply basic solution techniques to solve ODEs;
- apply numerical and graphical solution techniques to basic ODEs;
- apply Laplace transforms and series solution techniques to basic ODEs;
- apply matrix methods to solve systems of linear ODEs, and determine qualitative behavior of solutions.

Textbook and WebAssign:

1. The required book for this class is *A First Course in Differential Equations with Modeling Applications* by Dennis Zill, 11th edition, Cengage.
2. You will need to purchase access to WebAssign, where the online homework assignments will be. You can find this on the Longwood University bookstore website. **Access to WebAssign includes the digital version of the textbook**. You can purchase the WebAssign access/textbook at the campus bookstore.
3. If you have technical problems with WebAssign, you can find resources at their help site. It is *your* responsibility to resolve these technical issues as soon as possible. Please alert me if your initial contact with WebAssign does not immediately resolve the issue. **You can only access our WebAssign page through the WebAssign Online Homework module on our Canvas page. You will not need an access code.**

Graphing Calculator: You can use a TI-83 or TI-84 graphing calculator (or equivalent) that can graph functions. For your benefit, it may be helpful if the calculator can compute derivatives and antiderivatives, but this feature is not required.

Course Structure: You are expected to attend class and work outside of class. University policy expectations are that for every hour you spend in class, you spend an additional two hours outside of class on work, preparation, studying, etc. As a three credit course, this translates to about six hours a week outside of class along with the three hours in class. Please plan your time accordingly.

Evaluation: Below is a chart which represents how I will determine your grade in the course. Following that is a brief explanation of each category.

Homework	25%
Midterm Exam	20%
Term Project	25%
Final Exam	30%

Throughout the semester you will have homework assignments, a term project, a midterm exam and a final exam. Make-up exams will only be given in instances of documented emergencies.

Online Homework: Graded online homework will be given on an approximately weekly basis through WebAssign. The assignments may be of varying length and point values, but all will have an equal weight in the computation of your homework grade. Problems will be selected from the textbook and elsewhere. Your two lowest homework scores (as percentages) will be dropped at the end of the semester. You may work together with other students in our class on the homework assignments. You may also ask me for help during office hours or via email, and you may visit the QR Tutoring Center for help as well.

If you have technical problems with WebAssign, you can find resources at their help site. It is *your* responsibility to resolve these technical issues as soon as possible. Please alert me if your initial contact with WebAssign does not immediately resolve the issue. **You can only access our WebAssign page through the WebAssign Online Homework module on our Canvas page. You will not need an access code.**

Midterm Exam: There will be a midterm exam given in class on **Tuesday, February 28.**

Term Project: There will be a term project on modeling with differential equations. You may work individually or in groups of up to three students. The project will be assigned around the midterm date and due on **Tuesday, April 25**.

Final Exam: The cumulative final exam will be held on **Wednesday, May 3 from 11:30 AM–2:00 PM**. The entire Longwood University final exam schedule for Spring 2023 can be found here:

$$\texttt{http://www.longwood.edu/registrar/exam-schedule/}$$

You are allowed to use one handwritten 8.5" by 11" cheat sheet for each of the midterm exam and for the final exam (two-sided is OK). Cheat sheets that have been electronically created or modified (e.g., typed, or includes scaled-down pages) are not allowed. You are also allowed to use your graphing calculator on the exams, homework and project. Books, notes and all other electronic devices (such as phones) are not allowed on the exams.

Grading Scale: The following chart is used to assign your letter grade based on your weighted average.

□	□$^-$	□	□$^+$
A	[90,92)	[92,100]	N/A
B	[80,82)	[82,88)	[88,90)
C	[70,72)	[72,78)	[78,80)
D	[60,62)	[62,68)	[68, 70)
F	N/A	[0,60)	N/A

Course Structure and Student Expectations: You should expect to spend on average about 9 hours of your time every week on this course, including class time, reading, practice, homework and projects.

Tentative Weekly Schedule: Depending on the speed at which topics are covered in class and other factors, the schedule listed here could easily change by a week or so. Thus, it is important to attend class to be aware of changes in coverage.

Week	**Dates**	**Sections from book**	**Topics**
1	1/12	1.1–1.3	Intro. to ODEs
2	1/17, 1/19	1.1–1.3, 2.1	Autonomous ODEs & Phase Lines
3	1/24, 1/26	2.1, 2.2–2.3	Separable & Linear ODEs
4	1/31, 2/2	3.1–3.3	Modeling w/ 1st-Order ODEs
5	2/7, 2/9	Appendix B	Matrices
6	2/14, 2/16	8.1–8.2	Systems of Linear ODEs
7	2/21, 2/23	8.1–8.2, Supplement	Phase Portraits
8	2/28, 3/2	**Midterm Exam**	Phase Portraits, TD-plane*
9	3/7, 3/9	NO CLASSES	SPRING BREAK
10	3/14, 3/16	5.1	Modeling w/ 2nd-Order ODEs
11	3/21, 3/23	7.1–7.2	Laplace Transforms
12	3/28, 3/30	7.3–7.4	Laplace Transforms
13	4/4, 4/6	7.5–7.6	Laplace Transforms
14	4/11, 4/13	6.1–6.2*	Series Solutions*
15	4/18 (no class), 4/20	6.3–6.4*	Series Solutions*
16	4/25, 4/27	**Term Project due 4/26**	Catch-up, REVIEW
17	Wednesday, May 3	**Final Exam** 11:30 AM–2:00 PM	

*Topic will be covered if time permits.

Important Dates:

January 11	Undergraduate classes begin at 8:00 AM
January 16	MLK Jr. holiday - no classes
January 19	Last day to add/drop by 5:00 PM
February 17	Pass/Fail deadline by 5:00 PM
March 6–10	Spring Break - no classes
March 29	Withdrawal (W) deadline by 5:00 PM
April 18	Symposium Day - no classes until 5:30 PM
April 19	Student Showcase - no classes until 5:30 PM
April 28	Last day of classes

The Quantitative Reasoning (QR) Tutoring Center: There is also free tutoring for MATH 362 provided by the University. The location and times for this tutoring can be found here: `https://blogs.longwood.edu/qrcenter/`.

Attendance Policy: You are expected to attend class regularly. Attendance will be taken in class each day, but you are not graded on it. However, nonattendance almost always has a direct negative impact on class performance. In the event that you miss a class, it is your responsibility to seek out what you missed that day. I am happy to discuss missed material in office hours; however, I will not provide an individual lecture. There is no Zoom option if you miss an in-person class.

Absences are excused only for illness, college-sponsored activities and recognizable emergencies. You must have the proper documentation for an excused absence. Student Health Services can provide documentation only for students hospitalized locally or absent at the direction of Student Health Services personnel. You must also assume full responsibility for all material covered during your absence, including scheduling any make-up assignments or exams. A grade of zero will be assigned for all work missed due to unexcused absences.

Since class time is limited, only a limited number of examples and problems can be given and discussed in class. The textbook contains many worked examples. Class attendance is not a substitute for reading the text.

In the Event Class Goes Online: If our class goes online, we will meet via Zoom. The class Zoom link will be found at the top of our Canvas page. It is for use only by Longwood University students registered for this course.

Technology Policy: Learn the material using only the allowed resources. Ask me questions. You are permitted to use a TI-84 calculator on the homework, term project, midterm exam and final exam. Please note that you may not share calculators on the exams. The use of unauthorized materials such as phones, tablets or other electronic devices during an exam will result in an automatic zero for that assignment on the first offense; this is the minimum punishment. The use of Chegg is strictly prohibited in this class.

University Course Policies: You can find several university-wide course policies at

`http://www.longwood.edu/academicaffairs/syllabus-statements/`

Honor Code: Students are expected to conform to the Longwood University Honor System. Any submitted material is assumed to be pledged. All work should be done individually without resorting to any resource not permitted by the assignment instructions. If you are caught using resources that you are not allowed to use, you will get a zero on the assignment and your name will be turned over to the Longwood University Honor Board. If you are uncertain what you are allowed to use on an assignment, consult with the instructor immediately.

Academic Support Services: Students have access to a variety of academic support services on campus including:

QR Tutoring Center: `https://blogs.longwood.edu/qrcenter`
The Center for Academic Success: `http://www.longwood.edu/academicsuccess`
Longwood University Writing Center: `http://www.longwood.edu/academicsuccess/writing-center`
Tutoring Services: `http://www.longwood.edu/academicsuccess/subject-area-tutoring`
Counseling and Psychological Services (CAPS): `http://www.longwood.edu/caps`
Career Services: `http://www.longwood.edu/career`
University Health Center: `http://www.longwood.edu/health`
Registrar Office: `http://www.longwood.edu/registrar`
Financial Aid: `http://www.longwood.edu/financialaid`
First Generation Student Success Program: `http://www.longwood.edu/first-gen`

Protecting Intellectual Property: Content and materials for this course are for your learning only and should not be shared with others outside of the class. This includes the materials located within the learning management system, information sent to you through email, and/or content provided to you through webcasting with your professor. You may not share your course connection information (login or password), your content received through Canvas, or any videos sent to you that are specifically for this course. This includes sharing postings or recordings made by the instructor or students without permission of the originator.

When you are attending a course through web-conferencing (for example, Zoom), there should not be other persons interacting with the system or attending the session.

Any violation of this policy can result in disciplinary action. Faculty or students may report those who violate University policies regarding intellectual property to the Office of Student Conduct and Integrity.

Accommodations and the Accessibility Resources Office: If you require accessibility accommodations, please meet with your instructor early in the semester to discuss your learning needs. If you wish to request reasonable accommodations (note taking support, extended time for tests, etc.), you must register with the Accessibility Resources Office (ARO), Brock Hall, (434) 395-2391 prior to any accommodations being implemented in the course. The office will require appropriate documentation of accessibility needs. All information is kept confidential. The ARO webpage is here: `http://www.longwood.edu/accessibility/`. The ARO phone number is (434) 395-2391 and the ARO email address is

accessibilityresources@longwood.edu.

Mental Health Resources: Stress and anxiety are very typical reactions to college life and many students have experienced significant benefits from participating in counseling. Longwood's Counseling and Psychological Services (CAPS), located in the Health and Fitness Center, is available to all students at no cost. Appointments can be scheduled by phone (434)395-2409, during the hours of 8:15 a.m.–5:00 p.m. Monday–Friday. Resident Education Coordinators (RECs) and Resident Advisors (RAs) are additional resources to students. For emergency situations, please call (911) or contact the Longwood University Police Department at (434)395-2091.

Reporting of Crimes and Sexual Misconduct: In accord with its history and mission, Longwood University believes that each individual should be treated with respect and dignity and that any form of crime or violence is incompatible with Longwood's commitment to the dignity and worth of the individual. Longwood University is committed to providing a healthy living, learning and working environment which promotes personal integrity, civility and mutual respect. If you have been the victim of a crime or sexual misconduct we encourage you to report this. If you disclose this to a faculty member or employee (with the exception of our Limited Reporting and Confidential Reporting Resources; for example, the Counseling and Psychological Services (CAPS) staff), they are required by law to notify the appropriate University officials. The faculty member or employee cannot maintain complete confidentiality and is required to report the information that has been shared. Please know that all reported information is treated with discretion and respect and kept as private as possible. For more information about your options at Longwood: http://www.longwood.edu/titleix