

**Differential Equations: Math 221 – Section 302**  
**Fall Semester 2022**  
**TR 9:30pm – 10:45pm**  
**Burnett 119**

**Instructor:** Jack Jeffries

**Office:** 325 Avery Hall

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**Office Hours:** to be announced

**Textbook:** *A First Course in Differential Equations with Modeling Applications*, 11<sup>th</sup> edition, by Dennis Zill.

**Class engagement policy:** This is an in-person class. Class time will involve lecture, discussion, and groupwork, as well as quizzes. The expectation for the class is that you will participate in person as health and quarantine circumstances allow. If you are unable to attend in person, you should let me know, and we will arrange for you to participate some other way while you cannot attend in person.

**Calculators and communication devices:** No calculator having a built-in computer algebra system (CAS) will be permitted during any of the exams or quizzes. Examples of CAS calculators include the TI-89, TI-92, TI-Nspire, HP-40, HP-41, Casio ALGEBRA FX 2.0, Casio ClassPad 300 and 330. No phones or any devices capable of wireless communication including smart-watches are permitted at any time. As a courtesy to others please silence your phones (and switch off the vibrate mode) when you come to class.

**Special Dates:**

- September 2, 2022 (Friday): Last day to file a drop and remove a course from your record.
- October 14, 2022 (Friday): Last day to change your grade option to or from Pass/No Pass.
- November 11, 2022 (Friday): Last day to drop this course and receive a grade of W. (No permission required.) After this date you cannot drop.

**Departmental Grading Appeals Policy:** Students who believe their academic evaluation has been prejudiced or capricious have recourse for appeals to (in order) the instructor, the departmental chair, the departmental appeals committee, and the college appeals committee.

**Grading policy:** Your grade will have three components: problem sets, quizzes, and exams.

- The problem sets will be on Webwork. You can access the Webwork assignments through the course Canvas page.
- We will have short quizzes in class on a regular basis. Quiz times will be discussed in class.
- There will be two midterm exams and a final exam. The midterms will take place during class on Thursday, October 6, and Thursday, November 3. The final exam will be **Monday, December 12, 10am–noon**.

The following table summarizes the grading scheme:

Component	Value
Homework	20%
Quizzes	20%
Midterm Exams (two)	15% each
Final Exam	30%

Letter grades will be based on the usual 10 point scale (90 cutoff between A-/B+, etc.); however, grade cutoffs may be lower (i.e., grades may be higher).

**Topics:** The following is a tentative list of topics that we will cover in the course, along with a selection of textbook problems that are recommended for extra practice (not to be graded).

Sections/Topic	Recommended Exercises
1.1 Definitions and Terminology	1–8, 9, 11, 13, 15, 17, 21, 23, 24, 29, 41
1.2 Initial-Value Problems	1–5(odd), 7, 8, 11, 12, 17–23
1.3 Some Mathematical Models	1, 2, 5, 9, 10, 13, 17
2.1 Solution Curves Without a Solution	2, 15(a), 19, 20, 21–26
2.2 Separable Equations	1–9(odd), 23–25, 29, 31–33, 39, 41, 45
2.3 Linear Equations	1–13(odd), 17, 24, 25, 27, 37, 38
2.6 A Numerical Method	1, 3, 5, 6
3.1 Linear Models	1, 4, 5, 13, 15, 19, 21, 23, 27, 35, 38
3.2 Nonlinear Models	1, 3, 5
4.1 Preliminary Theory Of Higher order DE's	1–3, 9, 10, 15, 16, 17–21(odd), 23–27, 31–33
4.2 Reduction of Order	1–5(odd), 9, 11, 14, 16, 21, 22
4.3 Homogeneous Linear Equations	1–6, 13, 15–18, 25, 26, 29, 31, 34, 37, 38
4.4 Undetermined Coefficients–Superposition Approach	1–13(odd), 25, 27–33, 41
5.1 Spring/Mass Systems	1, 3, 8, 13, 25, 26, 29, 33–35
7.1 Definition of the Laplace Transform	11–33(odd), 43, 44
7.2 The Inverse Transform	1–5, 7, 9, 11, 13, 15, 16, 19, 20, 23, 35–39
7.3 Operational Properties I	1–8, 11, 13–15, 17, 21–27(odd)
7.4 Operational Properties II	1, 3, 5, 8, 11, 13, 14, 19–21, 23, 25, 27–30, 41–49(odd)
7.5 The Dirac Delta Function	1, 2, 3, 7, 9
8.1 Theory of Linear Systems	1, 2, 7, 11–14
8.2 Homogeneous Linear Systems	1, 2, 5, 6, 21–24, 31, 35, 36, 37, 38, 39, 40

**Students With Disabilities:** Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities office, 132 Canfield Administration, 472-3787 voice or TTY, <http://www.unl.edu/ssd>.

**Department Grading Policy:** Students who believe their academic evaluation has been prejudiced or capricious have recourse for appeals to (in order) the instructor, the department vice chair, the department chair, the departmental appeals committee, and the college appeals committee.

**Academic Honesty:** Academic honesty is essential to the existence and integrity of an academic institution. The responsibility for maintaining that integrity is shared by all members of the academic community. The University's Student Code of Conduct addresses academic dishonesty. Students who commit acts of academic dishonesty are subject to disciplinary action and are granted due process and the right to appeal any decision.

**UNL Course Policies and Resources:** Students are responsible for knowing the university policies and resources found on <https://go.unl.edu/coursepolicies>:

- University-wide Attendance Policy
- Academic Honesty Policy
- Services for Students with Disabilities
- Mental Health and Well-Being Resources
- Final Exam Schedule
- Fifteenth Week Policy
- Emergency Procedures
- Diversity & Inclusiveness
- Title IX Policy
- Other Relevant University-Wide Policies