

Northern Arizona University
College of the Environment, Forestry, and Natural Sciences
Department of Mathematics and Statistics

MAT 239 (Differential Equations) Syllabus

Fall 2023, 3 Credit Hours

Section 3 (3673) MWF 12:40-1:30 in AMB 162

Instructor Information

Instructor: Jim Swift Jim.Swift@NAU.edu AMB 110 523-6878 (voice mail)

Office Hours: M Tu W F: 11:30-12:40, Tu: 3:00-3:50

If these times are inconvenient, you can make an appointment, or drop by my office any time. E-mail is always a good way to contact me. If you send me email before 9:00pm on nights a WeBWorK assignment is due, I will reply that night.

Websites: Our class website is ac.nau.edu/~jws8/classes/239.2023.7/. I use the class web site for most electronic communication. I use Canvas for grades and for posting documents, like practice exams and scanned solutions, that I don't want the world to see.

Course Description

Text: *Elementary Differential Equations* 10th edition, by Boyce and DiPrima. This text is optional, and an older (or newer) edition is almost as good as the 10th. No homework will be assigned from the text. Most or all of the homework will be on WeBWorK. A link to Paul Dawkins' notes is on the web site.

Prerequisite: A grade of C or better in MAT 238 or current registration in MAT 238. You are responsible for making sure that you have met this prerequisite.

Content/Outline: Solutions of first-order differential equations, second and higher order linear equations, systems of linear differential equations, series solutions, numerical solutions of differential equations (chapters 1-5 and 7 of the text, with some skipped sections).

Student Learning Outcomes: Students will learn how to solve first order differential equations that are linear or have some other special form. Students will learn how to solve linear differential equations with constant coefficients. Students will learn how to use differential equations to model physical systems. There are many differential equations that nobody can solve. Students will learn a few methods of finding approximate solutions to these differential equations which cannot be solved exactly.

Course Structure/Approach The class will use lectures and in-class worksheets.

Assessment of Student Learning Outcomes

Points: There will be approximately 700 possible “class points.” All class points are assigned with the scale A (90%), B (80%), C (70%), and D (60%). The timeline for assessment is simple; whenever *class points* are assigned, they they are fully “curved” and will not change further. So at any point students can calculate the fraction of the possible class points obtained so far to determine their current grade.

Midterms: $\approx 43\%$ of grade ($3 \times 100 = 300$ class points) There will be 3 midterm exams. Each exam will have a raw score and a “curved” or scaled score based on 100 possible class points. Calculators are not allowed at the midterm exams or the final exam.

Quizzes and other assignments: $\approx 7\%$ of grade (approximately 55 class points) On some Fridays there will be a short quiz, worth 5 class points. The point value of the other assignments will be announced when they are assigned.

Homework: $\approx 21\%$ of grade (approximately $18 \times 8 = 144$ class points) We will be using WeBWorK for most of the homework. Each of WeBWorK sets is worth 8 class points.

Final Exam: $\approx 29\%$ of grade (200 class points) The Final Exam will be comprehensive. The final exam is scheduled for Monday, 12/11, 12:30-2:30

I reserve the right to raise your course grade from the 90/80/70 curve, based on an exceptional final exam.

Attendance: (6 extra credit class points for perfect attendance, down to 25 points deducted for never showing up) Attendance is mandatory, and will be recorded for every class period. At each of the 3 midterms, the students will receive an attendance score equal to 2 minus the number of unexcused absences since the previous exam. That is, you get 2 class points of extra credit at each exam, but you lose one point for every class you miss.

Extra credit: There are other extra credit opportunities. For example, extra credit will be given for the departmental “Problem of the Week.”

Course Policies

Calculators: No calculators are allowed at the exams. You may bring a calculator to class on non-exam days.

Laptops and Tablets: These are not allowed at exams, but you may bring them to class to take notes or do WeBWorK. No facebook, etc., please! You can download the pdfs of the worksheets to your tablet, and work the problems with your stylus. Similarly, you can download pdfs of the webwork assignments and work the problems on your tablet.

Late Homework: I can delay your individual due date and when your answers are available for WeBWorK assignments. I will handle requests on a case-by-case basis, but you must contact me *before* the due date. I reserve the right to deny your request.

Missed Class Days: I will allow excused absences, for extra credit purposes, for institutional excuses, illness, or other reasons that I approve. Please notify me of an absence by e-mail or voice mail *before* class if possible. Furthermore, if you are late and I take roll before you arrive, then you will be counted absent.

Makeup Exams: A similar policy to “Missed Class Days” holds. I will give a makeup exam for illness or other emergencies. Please notify me that you will miss an exam by e-mail or voice mail *before* the exam if possible.

Help: If you need help the first person to contact is me. I am your personal tutor at no charge. You can come to my office hours or contact me via e-mail. There is a button in WeBWorK for sending me e-mail. The Student Learning Centers have an array of free services, including drop-in or personal tutoring. Sadly, however, the MAP room, in AMB 137, does not serve MAT 239

Generative AI and the Internet This is a general policy statement, that might become the official Math/Stat departmental policy.

Since mathematical reasoning, problem solving, and critical thinking skills are part of the learning outcomes of this course, all assignments should be prepared by the student. Developing strong competencies in this area will prepare you for a competitive workplace. You may not submit assignments as your own work that directly copy all or a major part of the results of using ChatGPT or AI mathematics assistive technologies (e.g. Wolfram Alpha, PhotoMath, etc.). Such AI-generated submissions are not permitted and will be treated as plagiarism.

AI tools like ChatGPT may be permitted by the instructor to be used in a limited or indirect fashion for a particular type of assignment. In that case the AI tools should be used with caution and proper citation. AI is not a replacement for your own thinking and research. Over reliance on AI tools beyond that explicitly allowed is a violation of the departmental honor and ethics code. Any use of AI tools on quizzes and exams is expressly forbidden.

Academic Honesty Cheating on exams will not be tolerated, and procedures for reporting cheating to the university will be followed.

Suggestions: Try to do the webwork problems on your own. Keep an orderly journal with the problem number clearly indicated so you can refer to it. Do the work clearly so you can correct your mistakes. If you get stuck on a problem it is OK to look on the internet for help. But remember, there is no internet, no ChatGPT, “no nothing” allowed on tests. A sure way to fail this course is to

have the internet do your webwork for you. Another way to fail the course is to skip many of the webwork assignments.

Another suggestion is to study the in-class worksheets until you understand them deeply. These problems are more in the style of exam questions than the WeBWork problems are.

University and Departmental Policies: The web site has links to University and Departmental Policies.

Amendments: Any changes to this syllabus will be announced in class, and the updated version will be posted on my website. This version: December 8, 2023.