

Professor: David McClendon (2046 ASC, phone x2574 (231-591-2574 off campus), hours MW 12:00-12:50, MW 3:15-4:15 or by appointment, email: mcclend2@ferris.edu)

Lectures: MWF 10-10:50 in SCI 136.

Web: I maintain a personal web page at <http://mcclendonmath.com/330.html>; this page contains links, handouts, etc.

Required Materials: 1. My lecture notes, which can be obtained in either of two ways:

- as a course pack, available at the bookstore; or
 - online, at my web page as a pdf file
2. A copy of the mathematical software *Mathematica*, which as of Fall 2016 is available for download free of charge to all FSU students. Information on how to a personal copy of this software is available on my web page and is distributed with this syllabus.

If you have never used *Mathematica* before, I will give introductory sessions on how to use the software at various times during the first two weeks of class. You should attend one of these sessions.

Recommended Materials: 1. Colored pens or pencils (for better note-taking).

2. If you want or need a textbook other than my lecture notes, I suggest any of the following three:

- *Elementary Differential Equations* by Boyce and DiPrima, ISBN 0470458321
- *Differential Equations* by Blanchard, Devaney and Hall, ISBN 1133109039
- *Fundamentals of Differential Equations* by Nagle, Saff and Snider, ISBN 0321747739

These are all good books, but be warned - they all use different notation, and their language may be different from mine in places. If you do a Google search for these authors, it is possible that you may be able to find (pirated) pdfs of these books online.

Prerequisite: Math 230 with a grade of C- or better, or the equivalent. Here are the essential skills I expect a student in this class to possess:

- Strong algebra skills (exponent rules, factoring, multiplying out, moving terms from one side of an equation to the other, etc.)
- Strong calculus I/II skills (especially computing limits, derivatives and integrals; also working with series and some knowledge of basic calculus theory; see the handout distributed on first day of class for details)

Some material from Math 320 (Calculus III) and Math 322 (Linear Algebra) is useful in differential equations and will be covered in this course as necessary.

Course material: Ordinary differential equations (ODEs) (and systems of ODEs). What are they? Which ones can you solve? How do you solve those ones? What do you do with the ones you can't solve?

Learning outcomes: After completing Math 322, it is my hope and expectation that students will be able to:

1. solve first-order ODEs using analytic methods; analyze first-order ODEs using graphical techniques; and estimate solutions to first-order ODEs using numerical methods;
2. solve systems of first-order ODEs using analytic methods; analyze first-order systems of ODEs using graphical techniques; and estimate solutions to first-order systems of ODEs using numerical methods;
3. solve higher-order linear ODEs using analytic methods; and
4. model problems applying first-order ODEs, first-order systems and/or higher-order linear ODEs.

Grading policy: Homework: 20%. Three midterms: 18% each. Final exam: 26%. Grades will be curved at the end of the semester, but an average of 90% guarantees you at least an A-, an average of 80% guarantees you at least a B-, etc.

Attendance policy: I have no formal attendance policy. That said, **nothing** is more correlated with strong performance in my classes than attendance in lectures.

Homework: There will be regular homework assignments, due on dates announced in class as we go along. You can turn in homework in class or by putting it in the slot next to my office door marked “Math 330” (the homework is due whenever I go home on the day it is due). I will grade a subset of the homework problems for correctness. Homework assignments often require the use of *Mathematica*.

Some of the homework questions are meant to be challenging! In advanced math classes, you learn not only from lectures but by thinking about difficult homework problems. If you get stuck, come to office hours and ask questions, or work with a more able classmate, or go to the math club’s tutoring hours.

Midterms: There are three in-class midterms on dates TBA (a schedule of topics is distributed with this syllabus, but I do not know how long it will take to cover things, so I don’t know exactly when the exams will fall). No computers, calculators, notes, textbooks, etc. are allowed on the midterms. *However*, on the second and third midterms you will be permitted to use an index card with whatever you want written on both sides of it.

You may make up an exam that you miss (whether your absence is excused or not) but the makeup exams are considerably more difficult. If you miss an exam, contact the professor; you are to make up the exam at the *earliest possible time*.

While none of the midterms are directly cumulative, mathematics is by its nature cumulative (and it is the nature of ODEs to be quite cumulative). **In my opinion, the first midterm covers considerably easier material than the other two.**

Final exam: The final exam covers the entire semester, and will be held **Tuesday, December 13 at 10 AM** in the usual classroom. The ground rules are the same as the midterms (again, you may use an index card for reference).

Getting help: The best place to receive help is my office. In class, I will not have time to take any homework questions, and I will not be able to present all perspectives on a topic. In office hours, I am able to discuss the material at a much more friendly

pace and offer some alternate viewpoints that may help you understand the material better.

If you cannot make my scheduled office hours, you can come talk to me anytime my office door is open. Also, I am more than happy to make an appointment to discuss the material with you. Send me an email.

As a last resort, Khan Academy (khanacademy.org) has several free videos available on differential equations which do a good job explaining the material of the first part of the course (on first-order differential equations).

Students with disabilities who require reasonable accommodations to fully participate in course activities or meet course requirements should register with the Educational Counseling and Disability Services office (x3057, ecds@ferris.edu). While ECDS will send me a letter outlining the accommodations to make for you, I would appreciate it if you could contact me immediately for assistance with any necessary classroom accommodations.

Academic dishonesty: Papers will be monitored for “magic answers”. Issues with academic dishonesty are taken very seriously, will almost always result in an F for the class, and will be referred to the Office of Student Conduct.