Syllabus and course information

MAP 2302 — Elementary Differential Equations
Section 3146 (15301), Spring 2020
MWF 5th period, MAT 007

Link to class home page

Instructor : Dr. David Groisser

I receive a ton of email, so please be aware that:

- I won't answer math questions by email.
- **I don't answer email that lacks an *informative* subject line and the sender's full name.**
- I delete, without reading completely, any email that requires me to open an attachment whose nature or purpose I can't easily determine without opening.
- In general I answer students' emails **only on days that I normally have office hours, and only at certain times**. On office-hour days, I will generally respond to emails that arrive before the halfway mark of my office hour (or that arrived earlier, some time after my previous office-hour). For these emails, I will generally respond *during* my office hour if I have time left after I'm done seeing students, or *after* my office hour otherwise. *Exception*: I generally do not wait till the next office hour to respond to emails inquiring about (possible) typos in a homework assignment, or informing me of some problem with one of my course webpages.
- I never provide any grade information by email.

Office Hours: Tentatively Tuesday 6th period (12:50 – 1:40), Wednesday 9th period (4:05 – 4:55), and Friday 8th period (3:00 – 3:50). My office is Little Hall 308. Please come early in the period or let me know to expect you later; otherwise I may not stay in my office for the whole period. See my schedule for updates. Students who can't make scheduled office hours may see me by appointment on most weekdays (but ***never on a Thursday***). **If you have the flu or similar contagious disease, or think you might, please do not come to my office**.

Textbook: Nagel, Saff, and Snider, *Fundamentals of Differential Equations,* 9th edition. You may obtain access, at a discounted price, to the ebook-version and associated materials by following the instructions here. (I do not use Canvas.)

There will also be some required readings from notes by Dr. Groisser. These notes are linked to the Miscellaneous Handouts page.

Prerequisite: MAC 2312 or equivalent. You will need a good working knowledge of Calculus 1 and 2 (as well as precalculus algebra and trigonometry). In particular, you will be expected to know integration techniques; the chain rule; partial fractions; and

the algebra, calculus, and general properties of sines, cosines, and exponentials. **If you are weak in any of these areas, or it's been a while since you took calculus, you will need to spend extra time reviewing or relearning that material. Mistakes in prerequisite material will be graded harshly on exams.**

Prior knowledge of partial derivatives (usually covered in Calculus 3) is not a prerequisite but is helpful.

Syllabus (course content): This course is an introduction to *ordinary differential equations* (ODEs). ODEs enable a mathematical description of the laws of simple physics and virtually every science. We will cover chapters 1, 2, 4, and 6–8 of the textbook, with some omissions, and some material may be presented differently from the way it's presented in the book. Time permitting, we may cover some portions of chapter 3. Topics will include:

- concept of "ordinary differential equation" and meaning of "solution";
- statement and understanding of the fundamental existence/uniqueness theorem for solutions to initial-value problems;
- first-order methods (including separable, linear, and exact equations);
- some of the general theory of linear differential equations;
- second-order linear ODEs, with the constant-coefficient case treated in detail; method of undetermined coefficients; variation of parameters;
- higher-order linear ODEs, primarily the constant-coefficient case;
- method of Laplace transforms;
- power-series solutions of ODEs.

Exams. There will be three midterms (50-minute exams), each counting towards 20% of your final grade, and a cumulative final exam counting towards 40%. I reserve the right to adjust the percentages above in individual cases if I feel that circumstances warrant.

Tentative dates of the midterms are Feb. 3 (Mon.), Feb. 28 (Fri.), and Apr. 3 (Fri.). I will always give you at least a week's notice before an exam. **Do not, under any circumstances, use these tentative exam-dates as a guide to plan dates that you think you do not "need" to be in class, e.g. if you are thinking of being out of town on days that are not UF holidays. (See "Attendance Policy" and "What if you miss an exam?" below.) Expect a grade of 0 on an exam that you miss because you planned to be out of town on the date that the exam ends up being given.**

The final exam will be given Thursday Apr. 30, starting at 10:00 a.m., in our usual classroom. The date and time are set by the Registrar's Office; faculty members aren't permitted to change these.

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On exams, unless I say otherwise, you are responsible for knowing any material I cover in class, any subject covered in homework, and all the material in the textbook chapters we are studying.

Homework will be assigned daily and is due by the next class, but will not be collected. **It is critical that you keep up with the homework daily. Far too much homework will be assigned for you to catch up after a several-day lapse, even if your past experience makes you think that you'll be able to do this.** I cannot stress this strongly enough. Students who do not keep up with the homework frequently receive D's or worse (or drop the class to avoid receiving such a grade).

The assignments will be posted on the homework webpage. Assignments that are posted prior to class are estimates; they will often be modified within a few hours after class, according to how far we got that day. **You are responsible for checking this page frequently** (early enough for you to complete each assignment by its due-date), since in addition to updated assignments, other important information such as exam-dates will be confirmed on that page. Of course, changes of exam-dates will also be announced in class well in advance. However, **if you are unaware of a changed exam-date because you were absent when the change was announced and you didn't check the homework page for several days, and this causes you to miss an exam or do poorly on it, that poor grade (0 if you miss the exam) will still be averaged into your final grade according to the percentages above.**

On most days I will not answer homework questions in class; you should see me in office hours for questions about homework (or the material we're covering). Time permitting, the class day before an exam may be used for Q&A, during which homework questions will be fine.

In general I advise against using solutions-manuals. To learn mathematics, you need to see a *small* number of problems worked out by someone else, just to see the principles illustrated; you need to *do* a *large* number of problems by yourself. The problems that I assign are selected to be doable based on what should be your accumulated store of knowledge and skills from your previous math classes, plus the material cover in class and in the textbook up to that point. In the long run, you will learn more by struggling with a problem unsuccessfully for two hours, than by giving up after a few minutes and looking at someone else's solution. Also, the solutions in solutions-manuals are sometimes wrong or inefficient.

I do not currently plan to use any online homework system. I have not seen any that I could trust not to count some right answers as wrong, or some wrong answers as right.

Attendance policy. Students are expected to attend **every** lecture, barring such things as illness, weddings, funerals, family emergencies, UF-sanctioned extracurricular activities, and religious holidays of which I am informed in advance (see "Religious Holidays" below). **Students who *choose* (for other reasons) not to attend class regularly are forfeiting the right to my help in office hours, including**

regularly are forfeiting the right to my help in office hours, including explanations of their mistakes on homework and exams. These students should also not expect replies to their emails, even for questions like "Is there an exam tomorrow?" or "Have you decided when the next exam will be?" Also be aware that the University of Florida Attendance Policies contain the following paragraph:

> *The university recognizes the right of the individual professor to make attendance mandatory. After due warning, professors may prohibit further attendance and subsequently assign a failing grade for excessive absences.*

I expect students to arrive *on time* and to pay attention for all 50 minutes of the period. Arriving late is disruptive (as is leaving early). If a non-optional time commitment (e.g. a class the previous period in a distant location) will force you to be late on a regular basis, let me know at the start of the semester. **Students with a contagious illness are asked to exercise good judgment and to be considerate of their classmates and instructor when deciding whether to come to class. Coughing and sneezing in an enclosed space like a classroom or office is a wonderful way to spread germs.**

Classroom decorum:

- As mentioned above, I expect you to pay attention for all 50 minutes of the period. Reading the newspaper, reading messages on your phone, looking at your computer, talking, texting, etc., are disruptive and rude.
- All audible alerts from your electronic devices should be turned off. (If you ever need me to make an exception to this rule, e.g. because of a family medical emergency, let me know before class starts.)
- Please also avoid all other disruptive or distracting noises, such as the tapping of pencils or feet, or the zipping and unzipping of backpacks several minutes before the end of class.

Grading. The grades that UF currently allows instructors to assign are A, A–, B+, B, B–, C+, C, C–, D+, D, D–, and E. (For grade-point equivalencies of these grades, see this catalog page.) All of these are grades are possible in this class, except the D–.

In my philosophy (and that of my own college professors) of what a minus-grades means, a B–, for example, is *not* the lower end of the B range; it is *slightly but strictly below* the bottom of the B range, and means that your work falls a little short of "good". (Said another way: another professor whose estimation of how good your work was is the same as mine, but who regards B– as meaning "the low end of the `good' range", would *not* assign you a B–; he/she would assign you a C+.) This philosophy is consistent with the degree-requirements for most majors at UF: courses count towards your major only if you get a "flat" C or higher, because a C– means that your performance was *less than* satisfactory—not that it was *barely* satisfactory—and therefore that you did not satisfactorily complete the course. This philosophy is also consistent with UF's S-U grade option.

For similar reasons, I have never given the D– grade. "D" means "unsatisfactory but passing". I have always considered the next step down to be failing, which at UF is the E grade. (Because a C is usually needed for a course to count towards requirements for majors, minors, etc., an unfortunate number of faculty, advisors, and students have come to refer to every grade less than C as "failing". This is not the correct meaning of "failing grade", nor has it ever been; again see this catalog page.)

I don't have a predetermined grade curve or predetermined percentages for letter grades. I decide the grade scale for each exam and homework according to the philosophy "A = excellent, B = good, C = satisfactory, D = unsatisfactory but passing". At the end of the semester, I use the cutoffs from the exams and homework and to determine the final grade cutoffs on a 1000-point scale. For example if the cutoff for a B is 72% on the first hour exam, 69% on the second hour exam, 76% on the third hour exam, and 74% on the final, to get a B for the course you'd need .20 x (72%+69%+76%) + (.40 x 74%) = 73% of the total number of points in the course, i.e. 730/1000.

Since I don't determine the exam-grade cutoffs ahead of time, I can't tell you in advance exactly how many points you'll need to get a particular grade for the course. The grade-scale page for the last time I taught MAP 2302 (Fall 2019) may give you a rough idea of what to expect. You can find more examples of my past grade-scales by navigating from the "Past Classes" link on my home webpage. However, there is no guarantee that this semester's grade-cutoffs will be close to those of any particular past class of mine; they could be higher or lower. (There has been a great deal of variability in the strength of my students in the more than 30 times I have taught MAP 2302.)

Workload: On average, in order to receive an average grade, students should expect to spend eight to ten hours per week studying and doing homework for this class. This time-estimate is an *average,* not a maximum—some students will require more time, some less; some weeks the workload will be heavier, some lighter. Some circumstances that may increase your workload are:

- You did not study a similar amount in your previous calculus or precalculus classes.
- You have not retained the knowledge and skills that are the purpose of the prerequisites for this course.
- You cannot do algebra quickly and accurately without a calculator (this may be the case if you did not do a large number of exercises in your calculus or precalculus classes, or if you have relied heavily on calculators in the past).
- You want to get an A.

Additional Information

What if you miss an exam? If you miss an exam for a valid reason, and supply me with satisfactory documentation by your next day back in class, I will work out with you some way that is as fair as is feasible for you to make up the missing grade-

component. Except in very large classes (which I don't teach) with cookie-cutter exams (which I don't give), there is no such thing as a fair make-up exam. Thus, the way I have you make up the missing grade-component may or may not be via an exam. If you miss an exam for a reason that I do not consider valid (consistent with UF policy on which absences should be excused), or do not supply me with satisfactory documentation by your next day back in class, you should expect to receive a zero for that exam. If extenuating circumstances cause a reasonable delay in your providing me with satisfactory documentation, I may treat your exam-absence as valid and documented. (However, I will be the sole judge of what is "satisfactory", "extenuating", and "reasonable".) If you are too ill to take an exam, please notify me by phone or email before the exam starts (if possible), even if it's just a few minutes before.

Student Honor Code. UF students are bound by The Honor Pledge, which states:

> We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."*

The Honor Code (which can be found here) specifies a number of behaviors that are in violation of this code, and the possible sanctions. Furthermore, students are obligated to report to appropriate personnel any condition that facilitates academic misconduct. If you have any questions or concerns about student conduct, please consult your instructor.

Religious Holidays. The following is part of the University of Florida Policy on Religious Holidays. "Students, **upon prior notification of their instructors**, shall be excused from class or other scheduled academic activity to observe a religious holy day of their faith."

***Tentative, approximate* weekly schedule of lectures:** Click here. You are expected to read the relevant material in the appropriate chapter-section of the textbook no later than the day after we cover that material in class. Preferably, do the reading earlier than that.

Accommodations for students with disabilities. Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor, and discuss their accommodation needs, as early as possible in the semester.

Teaching-evaluations. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at gatorevals.aa.ufl.edu/students/. Students will be

respectful manner is available at gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals or via ufl.bluera.com/ufl/. Summaries of course-evaluation results are available to students at gatorevals.aa.ufl.edu/public-results/

Goal of course: For the student to master the course-content.

UF Health and Wellness Resources:

- **U Matter, We Care.** If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit umatter.ufl.edu/ to refer or report a concern, and a team member will reach out to the distressed student.
- **Counseling and Wellness Center.** Visit counseling.ufl.edu/ or call 352-392-1575 for information on crisis services as well as non-crisis services.
- **Student Health Care Center.** Call 352-392-1161 for 24/7 information to help you find the care you need, or visit shcc.ufl.edu/.
- **University Police Department.** Visit police.ufl.edu/ or call 352-392-1111 (or 9-1-1 for emergencies).
- **UF Health Shands Emergency Room / Trauma Center.** For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; ufhealth.org/emergency-room-trauma-center.

UF Academic Resources:

- **E-learning technical support.** The UF Computing Help Desk can be reached at 352-392-4357 or via e-mail at helpdesk@ufl.edu.
- **Career Connections Center.** This center, which provides career-assistance services and career-counseling services, is located in Reitz Union Suite 1300, and can be reached at 352-392-1601.
- **Library Support.** The website cms.uflib.ufl.edu/ask provides various ways to receive assistance with using the libraries or finding resources.
- Teaching Center. This center, located in Broward Hall, provides general study skills and tutoring, and can be reached at 352-392-2010. To make an appointment, call 352-392-6420.