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M 391.01: Special Topics - Topics in Ordinary Differential Equations

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Department of Mathematical Sciences
Fall 2021, Math 391-01
Topics in Ordinary Differential Equations

Instructor: Professor Emily Stone **E-mail Address:** stone@mso.umt.edu
Office: MATH 313 **Office Phone:** 243-5365
Office Hours: TBA

Course Description: In this course we will cover analytic solution techniques for first order differential equations (ODEs) and second order linear differential equations (including some series solution methods often used in Physics). The basic theory will be introduced. We will also study numerical methods for constructing approximate solutions, and qualitative methods for studying nonlinear ODEs. Modeling simple systems governed by ODEs will be discussed, along with the general analysis of linear systems of ODEs.

Texts: • *Differential Equations: An Introduction to Modern Methods and Applications, Enhanced eText.* Brannan, James, R. and William E. Boyce, Available from: WileyPLUS, (3rd Edition). Wiley Global Education US, 2019.

Prerequisite: M 273

Important Dates:

Sept. 6:	Labor Day Holiday - no classes
Sept. 8:	Last day to add via Cyberbear
Sept. 20:	Last day to drop via Cyberbear with refund
Nov. 1:	Last day to drop classes/change sections with instructor approval
Nov. 11:	Veteran's Day Holiday - no classes
Nov. 24-26:	Thanksgiving Day Holiday - no classes
Dec. 10:	Last Day for Drop Petitions

Exams: (tentative for Exams 1 and 2)

Oct. 15 (Friday):	Exam 1
Nov. 19 (Friday):	Exam 2
Dec. 14 (Tuesday):	Final Exam, 8:00–10:00 a.m.

Grading:

Homework	20% of course grade
Exams (2)	50% of course grade
Class Projects	10% of course grade
Final Exam	20% of course grade

SOME COMMENTS

Homework Assignments:

The homework sets are online in WileyPlus. They are due approximately weekly, with a few gaps. WileyPlus gives you some really good clickable help while you are doing the homework, which is why I am keen on using the system. Your scores will be transferred to the Moodle page, where your final grade will be tallied.

Class Projects:

Each chapter has a set of projects at the end, and we will work through one together as a group for each chapter we cover. I will begin each chapter by giving you a bit of background on the project, to give you context for the techniques we will be learning. At the end of the chapter we will work together in class to start the project, and on the following lecture you will be asked to present part of the solution, which I will assign. You will receive a participation mark for each project.

Wiley Resources:

As you poke around in the WileyPlus page you will find the online book, and other resources, like videos of lectures and code in Maple, Matlab and Mathematica. I would suggest at least skimming the reading and all the resources before you start work on a section, to orient yourself. You will need access to one of the 3 packages listed, or something that can perform similar operations. UM has a site license for Maple, and it can be installed in any lab. Mansfield library should have it as well. I can provide assistance with Matlab and Maple, but as I don't use Mathematica, I might not be much help there, or with other packages. Maple and Mathematica are true symbolic manipulators that you can write code in, and Matlab has a symbolic toolbox, if needed. Please feel free to share code and tools with each other if you find anything good out there.

Exam Information:

There will be two midterm exams and a final given on the dates listed on the first page of this syllabus. The final exam will be cumulative with a slight emphasis on the material covered after the second test. Make-ups for an exam will not be given unless you have a valid excuse and you contact me prior to the exam.

Grading:

Grading will be done on the usual percentage scale, 90-100% A, 80-89 % B, etc.

Students with Disabilities:

Students with disabilities should discuss accommodations with me.

Academic Misconduct:

All students need to be familiar with the Student Conduct Code. You can find it in the "A to Z Index" on the UM home page. From this, please note that all students are expected to practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University.

Final Note:

Announcements made in class are considered addenda to this syllabus. Please see the attached information about COVID protocols for in-person classes this semester.

2021 - SAFETY MESSAGING FOR IN-PERSON INSTRUCTION AND SYLLABI LANGUAGE

Our class is scheduled to be in-person, so the following instructions apply to us. Consider this information part of our syllabus.

- Mask use is required within the classroom or laboratory.
- If you feel sick and/or are exhibiting COVID-19 symptoms, please **don't come to class** and contact the Curry Health Center at **(406) 243-4330**.
- If you are required to isolate or quarantine, you will receive support in the class to ensure continued academic progress.
- We recommend students get the COVID-19 vaccine and/or recommend they reach out to Curry Health Center with concerns/questions.
- Where social distancing (maintaining consistent 6 feet between individuals) is not possible, class attendance and seating will be recorded to support contact tracing efforts.
- Please do not eat food or drinks liquids in our classroom. If you need to get a drink (say you are coughing or otherwise uncomfortable), you may excuse yourself to the hallway.

ACCOMMODATIONS FOR STUDENTS

As UM returns primarily to face-to-face classes, we anticipated that most students will be attending classes in person. If you require a COVID-related accommodation in order to participate safely, please contact the [Office of Disability Equity](#) (ODE) (formerly Disability Services for Students). ODE will work with the student and their advisor on a case-by-case basis.