Differential Eq/Linear Algebra

MATH - 2250 001

Course Description

Ordinary differential equations with applications to mechanics, electrical circuits, and populations; qualitative analysis; intro. to numerical methods; Laplace transforms; linear algebra applied to solution spaces, systems of DEs. It is recommended that students take MATH 2210 with Departmental Approval in the same semester as this course.

Pre-Requisite: Within the last year, MATH 1220 w/C grade or better.
Semester: All

Course Prerequisites

Completion of Calculus II (Math 1220) with a grade of at least C, preferably better, completed within the last year.

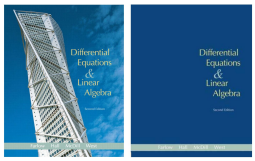
Course Student Learning Outcomes

- Model with Differential Equations.
- Solve Differential Equations.
- Understand and apply Linear Algebra Concepts.
- Analyze and solve Linear Differential Equations.
- Apply Linear Transformations and Eigenvalues.
- Examine and solve Linear Systems of Differential Equations.
- Utilize Laplace Transform Techniques.
- Implement Differential Equations in Applications.

College Wide Student Learning Outcomes

- Acquire substantive knowledge in their intended major
- Develop quantitative literacies necessary for their chosen field of study.
- Communicate effectively.
- Think critically and creatively.
- Develop civic literacy and the capacity to be community-engaged learners who act in mutually beneficial ways
- Develop the knowledge and skills to work with others in a professional and constructive manner.
- Develop computer and information literacy.
- Develop attitudes and skills for lifelong wellness.

Required Text or Materials



Title: Differential equations and linear algebra
ISBN: 9780134689548
Authors: Jerry Farlow, James E. Hall, Jean Marie McDill, Beverly H. West.
Publisher: Prentice Hall
Publication Date: I will post the first chapter so that might give you more time to acquire the book. It is a good reference, but our in class focus will not be going through the book examples.
Edition: Second

For more information on textbook accessibility, contact Accessibility & Disability Services at ads@slcc.edu.

Additional Materials

I will post daily worksheets and homeworks in assignments. Additional resources will be included in those assignments and they might be book references, videos, applets, etc

Engagement Plan

Attendance: The effectiveness of this course depends upon your preparation, attendance, and participation in the class meetings. Each student is expected to attend class every day and participate in an active, well-prepared discussion.

Group Work: We will often work in groups in this course. If a group hands in a written assignment, they are required to put on the paper the names of those who participated fully, and only those names. Each person must sign the final copy. Your signature certifies that you participated equally in the project. It is dishonest to turn in work that is not solely and equitably the creation of the team members. You are not required to include on the report the name of someone who started but did not finish, or who did not contribute their share.

My role: It is my goal to provide materials that are relevant, rigorous, and engaging. I will do my best to accomplish those goals in our every class and on all of your assignments. It is, further, my duty to provide you with honest, timely and relevant feedback so you can improve your understanding and your work. Finally, I am here to support you on your mathematical journey and you should feel free to seek the assistance you need. Should you perceive that I have not succeeded in any one of these goals, please do not hesitate to contact me and share your feedback. We all need different things to succeed, and only by knowing what that is for you, can I try to be of help. Please know that no honest feedback will ever be met with anything other than appreciation and reflection, and necessary action. In the event that we disagree, I will try to explain my position and decision as best I can.

Keys for Success (how to succeed in the course)

The best approach is to strive for a solid understanding of the course topics and to accept at the start that this necessarily entails some struggling with ideas and feelings of frustration. The course problems take time, especially time to explore and think about the

ideas. Often your will need to walk away for a while or for a day, and return to a problem for a second or third look before writing up your response. Expect this.

However, do not get behind on the problems. Try to cultivate an approach that is a nice balance between ”just getting it done” and avoiding it altogether.

We will organize

- study groups - we'll collect information about people's available times. I will help facilitate this. And in order to be available to most of the class, I'll change the office hours so they might be beneficial to most of you. In general, you should expect to spend another four hours on the class related activities in addition to the class time - but this of course always depends on your personal study habits and needs.
- online discussions - these could be for questions you have at a random time when you think I might not be available to respond. Or in general, having more resources is always helpful!

Brief Description of Assignments/Exams

Writing is an important part of the process of learning mathematics. It is virtually impossible to do mathematics without writing about it. Writing is a tool for communicating ideas to other people, but it can also be used as a tool for clarifying one’s own ideas. It can be very hard to spot a flaw in a line of reasoning if you haven’t written it down; conversely, writing down a line of reasoning is often the best way to expose any problems that it might have. More on this below.

Homework We will have two types of homework.

- Online: There will be daily assignments in canvas that are completed online, where you'll have as many attempts as you need to and will receive immediate feedback. These will be somewhat shorter with mostly procedural questions that attend to the skills you need to develop.
- Written: Throughout this course, I will be assigning a series of problems for you to solve and write about. Some of these problems will be graded only on how complete they are; others will be graded not only on the completeness and correctness of your answer, but also on the clarity of your explanations. You should explore each

question and write out your thinking in a way that can be shared with others. Focus on your own ideas and understandings, and turn in whatever your thinking is on a question, even if only to say, ”I do not understand such and such” or ”I am stuck here.” Be as specific as possible. Conjecture. Use pictures. Respond to my comments and questions.

Participation will be graded based on the daily group work, your participation and contributions in class. We will discuss this together.

Group project: There will be at least one major group project assigned during the semester that will make up a significant part of your final grade

Exams: I am obligated by the department to have at least 2 exams and a final. Currently we have 3 exams on the calendar, but we can talk about the exact number. Final exam will be cumulative and its score will replace the lowest exam score (if lower than the final).

Individual assessment: Often people have a preferred way of demonstrating their understanding. Maybe writing a paper, creating a podcast, poster, video, or some other means of showing their learning. We can discuss an alternate means of assessment when we meet individually.

The various assignments will contribute to your grade according to the following schemeL

- Online Homework - 5%
- Written homework - 10%
- Class participation - 10%
- Group project - 5%
- Individual assessment - 5%
- Regular Exams - 40%
- Final Exam - 25%

Grading Scale

	A 93+	A- 90 -92.99
B+ 87-89.99	B 83-86.99	B- 80-82.99
C+ 77-79.99	C 73-76.99	C- 70 - 72.99
D+ 67-69.99	D 63-66.99	D- 60-62.99
	E 0-59.99	

There is often confusion about the grading scale and rounding. I tried to be clear about my policy here.

Collaboration

You are strongly encouraged to work with other students on solving homework problems. Most mathematicians spend a lot of time discussing the mathematics they are thinking about. Like them, you may find that you understand the mathematics you are learning better after talking it through with a collaborator or two. However, all submitted work must be written up individually unless it is a group product. You must be comfortable explaining what you have written. If you really lean on a collaborator, please include a written acknowledgement of this with the name of your collaborator along with your solution. This will not detract from either person's grade. Be aware that it is not acceptable to copy someone else's written work and it is not acceptable to copy from a solution sheet or solution manual. This is considered academic dishonesty.

You are encouraged to form study groups with your classmates. We will also form one at the beginning of the semester. This is a wonderful way to learn the material, and it can make studying more fun. Discussion helps solidify the ideas as well as increases fluency in the language of mathematics. Even if you think you already “know" the material, you can always understand the material in a deeper way by explaining it to others. It is a common observation among mathematicians that every time they teach even an introductory class, they understand the material a little better - you will likely see the same benefit in a study group!

Academic Integrity

I consider it part of my job to raise students who value the process of learning as much as the final product. Plagiarism and cheating are both unacceptable and will result in an appropriate consequence which are described in our Code of Students' Rights and Responsibilities.

Today's tools allow us to find answer to pretty much any problem I could ever give you. But this class is not about having a ChatGPT or some other bot do your work. This (and any other class you take) is about learning the material for yourself so you can be the bot's boss, not just a user.

Side note/most important note: most people cheat when they are afraid of something and fear is common and understandable. If you feel it, come talk to me.

How to Navigate to Canvas

Institutional Policies

As members of our academic community, we would like to invite you to review the Institutional Syllabus which covers important policies and procedures. This document contains important links for students on the code of student rights and responsibilities, academic integrity, and grading policies, Title IX and other important acknowledgements. By familiarizing yourself with this information, you can help us create a safe and respectful environment for everyone.

For more information, navigate to the Institutional Policies tab on the Institutional Syllabus page.

Learning Support and Tutoring Services

We are pleased to offer a range of tutoring and learning support services to help you achieve your academic goals. Whether you need assistance with a specific subject or want to improve your study skills, you have many options for tutoring or other support.

To learn more about the services we offer and how to access them, visit the Institutional Syllabus page under the Tutoring and Learning Support tab. We encourage you to take advantage of these resources to help you succeed in your studies. If you have any questions or would like to schedule a tutoring session, please don't hesitate to reach out to us. We are here to support you in any way we can.

Advising and Counseling Support Services

At our institution, we are committed to supporting your academic and personal growth. That's why we offer a range of advising and counseling services to help you navigate the challenges of college life. To learn more about the resources available to you and how to access them, visit the Institutional Syllabus page under the Advising and Counseling Support Services tab. Our advising team and the support centers across campus are here to support you in achieving your goals and overcoming any obstacles you may face.

Student Academic Calendar

As students you should be aware of all important dates in the semester, such as the day that courses begin and end, as well as the drop date and the last day to withdraw. To learn more about those dates, navigate to the Student Academic Calendar below:

SLCC Student Academic Calendar

Assignment Schedule

Due Date	Assignment Name	Assignment Type	Points
	Introduce Yourself	Discussion	0
	PSet1 discussion	Discussion	0
8/27/25	Day 1 Participation	Quiz	0
9/2/25	Assignment 1	Assignment	20
9/3/25	Day 2 Participation	Quiz	10

Due Date	Assignment Name	Assignment Type	Points
9/7/25	Online Assignment 1	Assignment	23
9/7/25	PSet 1	Assignment	100
9/8/25	Day 3 Participation	Quiz	10
9/9/25	PSet2	Assignment	100
9/10/25	Day 4 Participation	Quiz	10