

Math 229, *Vector Calculus with Chemical Applications*

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Fall 2022 — updated on November 20 to add the final exam date and time

1 Basic information

Class times and places. Monday, Wednesday and Friday noon–12:50 pm in MYBK 223 and Tuesday and Thursday 12:15–1:30 pm in MYBK 224.

Texts. We will primarily use the eponymous PDF book *Math 229: Vector Calculus with Chemical Applications* by Professor Jason Howell and myself, which will be distributed through the [OAKS](#)¹ LMS.

For the calculus topics (about 3/4 of the course) we will also use free texts

- [OpenStax Calculus, Volume 2](#)²
- [OpenStax Calculus, Volume 3](#)³

from the [OpenStax](#)⁴ project. These are available in multiple forms through the site above: HTML, PDF for download, as apps for iOS and Android, and in inexpensive printed versions.

Thus there is no text that you need to buy; however if you like printed references, in addition to those OpenStax texts another inexpensive book that complements much of the material in this course is

- *The Chemistry Maths Book* by Erich Steiner, Oxford University Press.

Professor's Office hours. To be arranged during the first week of classes; for now I am available after Tuesday's class and otherwise by appointment, either in my office or via Zoom. (Unfortunately I have another class immediately after this one on all days except Tuesday, so can only talk briefly after class!)

Professor's Office. Room 344, Robert S. Small Building (opposite Maybank Hall).

Professor's Email Address. lemesurierb@cofc.edu

Professor's Phone. 953-5730; messages only.

Professor's Website. <http://blogs.cofc.edu/lemesurierb/>, but most online communication will be through [OAKS](#)⁵.

Prerequisites. C⁻ or better in MATH 120 or HONS 115.

¹<http://lms.cofc.edu/>

²<https://openstax.org/details/books/calculus-volume-2>

³<https://openstax.org/details/books/calculus-volume-3>

⁴<https://openstax.org>

⁵<http://lms.cofc.edu/>

2 Course Objectives and Student Learning Outcomes

By the end of the course, students should:

- be familiar with multidimensional coordinate systems and how to convert coordinates, functions, and equations from one coordinate system to another;
- be able to use vectors to describe lines and planes in multidimensional space;
- be able to represent geometric actions and transformations through matrix operations on vectors;
- be able to represent functions using infinite series;
- be able to calculate partial derivatives of multivariate functions;
- be able to calculate integrals of multivariate functions.

These outcomes will be assessed on the mid-semester tests and the final exam.

3 Class Details

Peer Tutor. I aim to have a peer tutor who will run sessions about once a week; tentatively on Wednesdays. Those will be one opportunity to ask questions about and work on Examples, Practice Problems and Exercises from the PDF book and OpenStax text, and so on.

The Extra Scheduled Hour Per Week. The schedule for classes in this five credit hour course actually provides six fifty minute "hours", and this extra fifty minutes per week provides some flexibility. Some of the extra time will be used to reduce Tuesday classes to the length of a "one hour" MWF class; I plan to use the remaining time to finish lecturing on new material by Thanksgiving, with the last week devoted to a review homework assignment and a review session by the peer tutor.

4 Study Aids

Reading Assignments and Question Time. I will usually set reading at the end of each class, and start each class with time for questions on the reading, exercises and such.

Practice Problems and Exercises. The PDF book for this course contains numerous Practice Problems (with solutions) and Exercises (solutions provided later); reading each section as we cover it in class and then working on these is a good place to start your study. I will also suggest further exercises in the above online references.

Peer Tutor. I aim to have a peer tutor (an advanced Math/Chemistry major) who will run sessions about once a week; tentatively on Wednesdays. Those will be one opportunity to ask questions about and work on Examples, Practice Problems and Exercises in the book, and so on.

OAKS. OAKS, including Gradebook, will be used for this course throughout the semester to provide the syllabus and class materials and grades for each assignment, which will be regularly posted.

Calculators. It might be useful to have a graphing calculator, and a common recommendation is the Texas Instruments TI-84 Plus.

However, many choices of free "calculating device" can work too, including websites, phone apps and computer software, and I will demonstrate some of them. One of my favorites is the [Desmos Graphing](#)

[Calculator](#)¹; in addition to that website interface, this is available as a free app for [iPhones](#), [iPads](#)², and [Android](#)³ devices.

There are also several other tools at the [Desmos website](#)⁴, such as a [Scientific Calculator](#)⁵.

5 Graded Work and Grading Scheme

5.1 Quizzes

There will be a quiz most weeks, usually in the Thursday classes. The content of the quizzes will be based on lectures, reading assignments, and the above practice problems and exercises. No make-up quizzes will be given; however, the lowest quiz score will be dropped.

5.2 Mid-term Tests

There will be four mid-term tests, provisionally scheduled for the classes of

- *Thursday September 8,*
- *Thursday September 29,*
- *Thursday October 20, and*
- *Thursday November 10.*

If you miss any of these, the score can be made up only for very convincing reasons.

5.3 Final Exam

This will primarily address topics covered after the last mid-term test.

After consultation with the class, the final exam will be held *from 1:00–3:00 pm on Saturday December 10* (based on our TR meetings).

5.4 Grading Scheme

The total grade will be weighted 15% on the quiz total, 15% on each midterm test, and 25% on the final exam. However, if the final exam grade is higher than the lowest mid-term test grade or the quiz total, the final exam will have weight 35%, and that low score will count only 5%. The aggregate score guarantees at least the following letter grades:

A	A ⁻	B ⁺	B	B ⁻	C ⁺	C	C ⁻	D ⁺	D	D ⁻
90–100	87–89	84–86	80–83	77–79	74–76	70–73	67–69	64–66	60–63	57–59

6 Participation Requirements

Attendance to all classes is expected, as is active participation in all the work described above. You are responsible for knowing what happens in each class including assignments, information about quiz and test topics, and due dates: thus if you miss a class, check for news, either from a classmate or from me; checking the course's section in [OAKS](#)¹ should help.

¹<https://www.desmos.com/calculator/>

²<https://apps.apple.com/us/app/desmos-graphing-calculator/id653517540>

³<https://play.google.com/store/apps/details?id=com.desmos.calculator>

⁴<https://www.desmos.com>

⁵<https://www.desmos.com/scientific>

¹<https://lms.cofc.edu>

Absence from a test or more than three quizzes without adequate explanation will lead to failing the course due to absence (formerly known as W/A). Thus if you miss any of these, you should contact me promptly to explain why.

7 Inclement Weather, Quarantine/Isolation Due to Covid-19 or Other Substantial Interruption of Instruction

If in-person classes are suspended, I will announce a detailed plan for a change in modality to ensure the continuity of learning. My plan in the case of a hurricane evacuation or if one or more students are absent for an extended period of time due to COVID-19 (quarantine or isolation) is that the class will be conducted exclusively online until we can all return to the classroom. Thus, all students must have access to a computer equipped with a web camera, microphone, and Internet access. Resources are available to provide students with these essential tools.

Such online classes will be recorded and the recordings posted in OAKS. By attending and remaining in any such online class, a student consents to being recorded. Recorded class sessions are for instructional use only and may not be shared with anyone who is not enrolled in the class.

Scanning and submitting hand-written work. Such a move online could lead to the need to submit work online; if so, this will be done by uploading PDF files to OAKS, either created by scanning hand-written work or from a word-processor or such.

To submit hand-written work it is best to use a dedicated scanning app on a smart-phone (or an actual desktop document scanner, if you have one).

Note: It does not work well to simply photograph written work and submit JPEGs or such; those images often come out too dark and too low-contrast to be easily read.

One app that has worked for me is *Adobe Scan*, available free for iOS and Android. (Note: this has options for in-app purchases, but I have not needed any such "upgrades"). Others that have got good reviews from students are *Microsoft Lens* (for iOS and Android) and *Doc Scanner, from Zoho* (which is only for iOS, as far as I know).

If you use and like another option, please let me know.

8 Accommodations for Students with Disabilities

If you have a documented disability, please contact me during the first two weeks of class or as soon as you have been approved to receive accommodations, so that reasonable accommodations can be arranged. Approval for such accommodations is arranged through the Center for Disability Services: see <http://disabilityservices.cofc.edu/accommodations/>

9 College of Charleston Honor Code and Academic Integrity

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved.

Cases of suspected academic dishonesty will be reported directly to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student's transcript for two years after which the student may petition for the XX to be expunged. The F is permanent. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

Students should be aware that unauthorized collaboration – working together without permission – is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz

and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others' tests, fabricating data, and giving unauthorized assistance.

Students can find the complete Honor Code and all related processes in the Student Handbook at <https://deanofstudents.cofc.edu/honor-system/studenthandbook/>

10 Some Important Dates and Times

Tuesday August 23	First day of classes.
Monday August 29	Last day to drop/add courses.
Monday September 5	Labor Day—classes <i>do</i> meet.
Thursday September 8	Test 1 proposed date.
Saturday September 24	Storm day makeup, if needed (classes will be made-up online).
Sunday September 25	Storm day makeup, if needed (classes will be made-up online).
Thursday September 29	Test 2 proposed date.
Thursday October 20	Test 3 proposed date.
Friday October 28	Last day to withdraw with a grade of W.
Mon. & Tue., November 7 & 8	Fall Break—no classes.
Saturday November 12	Storm makeup day, if needed (classes will be made-up online).
Sunday November 13	Storm makeup day, if needed (classes will be made-up online).
Thursday November 10	Test 4, proposed date.
Wednesday November 23–Sunday November 27	Thanksgiving Break.
Monday December 5	Last day of classes.
Tuesday December 6	Reading Day.
Saturday December 10, 1–3 pm	Final Exam (based on the TR schedule).