

COURSE OBJECTIVE: This course extends the ideas of single-variable calculus (*e.g.* limits, differentiation, integration, optimization, fundamental theorems) to functions of several variables. Topics include vectors and vector operations, vector-valued functions and curves in space, multivariable functions, partial differentiation, multiple integrals, line integrals, surface integrals, and the theorems of Green, Stokes and Gauss. These concepts form the mathematical basis for many areas in science and engineering. The aim is for you to learn these concepts and to critically and creatively solve problems.

TEXTBOOK: *Essential Calculus*, 2nd Edition by James Stewart. You will also need an access code for WebAssign's online homework system, which you may already have if you have taken a previous APPM Calculus course. If this is your first APPM Calculus course, you will need to purchase WebAssign access.

GRADESCOPE: All student work will be submitted to Gradescope. No paper will be graded. Access Gradescope through the Canvas course page (link on the left side of the main Canvas page). You will scan each assignment into a single PDF file (NO photos) and then select which pages contain each problem (according to the Gradescope outline) when submitting each assignment. Failure to assign pages to each problem may result in a penalty.

Information about submitting to Gradescope can be found in the Assignment Workflow section of this [link](#) as well as the Scanning Your Work on a Mobile Device and Submit an Assignment sections [here](#). Further information about Gradescope (*e.g.* regrade requests, adding group members to a submission) is available in the other sections of this [link](#). A Gradescope app for mobile devices is available. See this [link](#) for more information. An optional practice assignment exists in Gradescope that you can use to practice uploading an assignment.

If you experience Gradescope submission issues during a quiz or exam, be sure to contact your proctor/TA **PRIOR** to leaving the quiz or exam to ask for assistance. Original paper documents will not be used for any grading purposes. *Verification of the **complete and on-time** submission of all work to Gradescope is the student's responsibility.*

RECITATIONS: Recitations meet on Thursdays in non-exam weeks (see course schedule). Quizzes are taken in recitations. Additionally, the purpose of the recitation is to help clarify, within a small group setting, the concepts and techniques covered in lecture, understand the homework, and practice solving more problems.

QUIZZES: Quizzes are given in recitation on most Thursdays throughout the semester (see course schedule). Quizzes are closed note/closed book and crib sheets are not allowed. Quizzes generally cover material from lectures that occurred roughly within the last week to ten days (excluding the day prior to the recitation) and will be 10 minutes long.

Electronic devices of any kind (*e.g.* calculators, computers, tablets, music players, cell phones, head phones, *etc.*) are **NOT** allowed during the quizzes. An exception to this is that a computer/cell phone is allowed only to upload your quiz solutions to Gradescope within 10 minutes of the end time of the quiz. Any other use of electronic devices during a quiz is considered a violation of the Honor Code.

If you experience technical problems submitting your quiz to Gradescope, ask your TA for assistance **PRIOR** to leaving the recitation. If you do not submit your quiz to Gradescope or, when experiencing technical issues fail to discuss alternative arrangements with your TA before leaving the quiz, it will not be accepted or graded. If you take the quiz in a recitation other than the one for which you are registered, it will not be accepted and you will receive a grade of 0 for that quiz.

No make-up or late or early quizzes will be given. Your lowest quiz score (regardless of the reason) will be dropped from your final grade calculation.

WRITTEN HOMEWORK: Written homework assignments become available in Canvas at 6:00 PM Mountain time generally one to two weeks prior to the due date (see course schedule). Your written homework solutions are submitted to Gradescope. The deadline for homework submission is 11:59 PM Mountain time on the due date indicated in the course schedule and on the homework. A late submission window for submitting written homework extends to 11:59 PM Mountain time 3 days beyond the due date (this does not apply to the first and last written homework of the semester). After that time you cannot submit the homework and will receive 0 points for that assignment. You are allowed two late and penalty-free written homework submissions during the semester. Any further late submissions will not be graded and will receive 0 points. **Written homework sent via email will not be accepted.**

Hand in organized and neat work. Grades for written homework will be based on the correct answers to selected problems as well as the proper notation and work shown to arrive at answers. You need to follow the guidelines located [here](#) when writing up homework solutions. Failure to do so may cause loss of points on your homework grade despite having the correct answer.

Assignments may include the final answer to some of the problems; to obtain full credit on these, you must demonstrate the logic that leads to that given answer. Some of the written homework problems may require the use of mathematical software such as MATLAB, Desmos, GeoGebra, *etc.* to complete.

ONLINE HOMEWORK: All students are expected to complete online homework in WebAssign. When accessing WebAssign, use your IdentiKey credentials and **always** log in to www.webassign.net/colorado/login.html.

Assignments become available at midnight Mountain time on the day the section is covered in lecture and are due no later than 11:59 PM Mountain time on the days shown in the course schedule. For each assignment, you are allowed to grant yourself an extension within

two days of the original due date. Once the extension has been made, you then have two days to complete the assignment. Note that any submissions made during an extension will incur a 25% penalty.

You should treat the WebAssign homework like the written homework, doing the work on paper, showing the proper steps, notation, justification, following the [guidelines](#) noted earlier, *etc.*, prior to submitting your answer into the system. For most problems you have 100 attempts to submit the correct answer; true/false and multiple choice problems allow fewer attempts. This gives you more practice in writing up solutions, similar to what will be expected on your other work, including exams.

WebAssign can be rather picky at times when accepting correct answers. Taking cues from the format of the answer box helps with entering correct answers. Also, keep in mind that if the problem does not ask you to round to a certain number of digits you will want to enter an exact answer (*e.g.* $\sqrt{2}$ versus 1.414). WebAssign #00 is an optional assignment that students not familiar with WebAssign might want to look at.

Many WebAssign technical issues can be resolved by clearing your browser history/cache and/or restarting your browser. This [site](#) has more details on how to accomplish this.

EXAMS: There will be three midterm exams and a comprehensive final exam. The midterm exams will be given on Wednesdays (**February 15, March 15, April 19**) from **6:30 PM–8:00 PM Mountain time**. The comprehensive final exam is **Monday, May 8 from 10:30 AM–1:00 PM Mountain time**. *These are the only times the exams will be given and there will be no make-up or early exams.*

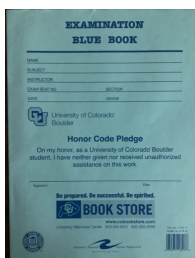
If you are unable to take a midterm exam due to illness you must e-mail the course coordinator (eric.thaler@colorado.edu) prior to the exam, asking to be excused from the midterm. If excused from a midterm exam, your other exam scores will carry more weight in determining your final course grade. If unexcused, a zero will be recorded for your midterm exam score and factored into your final course grade. All students are required to take the final exam. If you are unable to take the final exam at the scheduled time due to illness, you will need to make arrangements with the course coordinator (eric.thaler@colorado.edu) to take the final exam at a later date.

Electronic devices of any kind (*e.g.* calculators, computers, tablets, music players, cell phones, head phones, *etc.*) are **NOT** allowed during the exams. An exception to this is that a computer/cell phone is allowed only to upload your exam solutions to Gradescope within 10 minutes of the end time of the exam. Any other use of electronic devices during an exam is considered a violation of the Honor Code.

If you experience technical problems submitting your exam to Gradescope, ask your proctor for assistance **PRIOR** to leaving the exam. If you do not submit your exam to Gradescope or, when experiencing technical issues fail to discuss alternative arrangements with your proctor before leaving the exam, it will not be accepted or graded.

You are allowed one 8.5"×11", single-sided crib sheet for the midterm exams and one 8.5"×11", double-sided crib sheet for the final exam. It is strongly suggested that these crib sheets be handwritten.

BLUEBOOKS: Each student is required to purchase **four (4)** 8.5" × 11" examination blue books and give them to their TA in recitation by February 9. Bluebooks from all students are pooled together to be used during the exams, so **do not** write anything anywhere on or in these bluebooks before turning them in. These can be purchased at the CU bookstore and elsewhere and look like this:



Empty bluebooks will be handed out in the exam room. You will write your solutions to the exam problems in the bluebook, then scan your solutions into a single PDF and upload that to Gradescope (selecting pages for each problem according to the outline), turn in your bluebook to the exam proctor, have your BuffCard scanned, and then leave the exam room. You are responsible for scanning/uploading all of your solutions from your bluebook to Gradescope **PRIOR** to leaving the exam room. Bluebooks will not be graded manually nor used to upload missed pages after leaving the exam room, so be sure that you are satisfied with your Gradescope submission before leaving the exam room.

CORRECTIONS/REGRADE POLICY: Canvas, not Gradescope, is the official repository for your course grades. It is the student's responsibility to verify that grades have been correctly entered into [Canvas](#) within one week of the grades being posted to Canvas. After the one week deadline, your instructor/TA will assume the grades in [Canvas](#) have been correctly recorded and no further changes will be made. The one week period for regrades and corrections will be significantly shorter for the last several assignments (including the final exam).

All regrade requests are made through Gradescope (see this [link](#) for more information) and must include a detailed explanation addressing the specific grading errors. Submit a separate regrade request for each problem you want regraded. It is possible that regrade requests may result in a lower score as regraders have the option to look at the entire assignment in addition to the problem specifically noted in the regrade request. For exam regrades, you should check your solution against the solutions in the [exam archive](#) prior to making regrade

requests. Exam solutions will be available in the exam archive by the time grades are posted to Canvas.

GRADE DETERMINATION: You can earn up to 600 points in the class, distributed as follows: written homework (30 points), WebAssign homework (30 points), quizzes (90 points), 3 midterm exams (100 points each) and a comprehensive final exam (150 points).

After the final exam, if you have earned less than 55% of the exam points (midterms and final), then you will not receive a passing grade. If you have earned at least 55% of all the exam points (midterms and final), then your homework and quiz scores will be factored in to determine your course grade (final percentage rounded to the nearest tenth of a percentage point). The approximate course grade cutoffs will be calculated based on the following:

$$A- \geq 90\% \quad B- \geq 80\% \quad C- \geq 65\% \quad D- \geq 55\%$$

These grade cutoffs may be lowered very slightly (made easier) but they will not be raised. Note that your exam scores weigh heavily in the final grade computation. It behooves you to perform well on the exams and that is aided by doing well on the homework and quizzes.

Statistics from previous semesters show that most students who do all of the written and WebAssign homework earn a course grade about a half to full letter grade above the class average.

CALCULUS 3 WORKGROUP: Calculus 3 Workgroup (APPM 2351) is a one credit, pass/fail course designed to provide additional practice and support for students. Students work in groups, discussing their ideas and solutions, in a collaborative setting. Students who enroll in these workgroups typically get higher course grades than students with a similar background who do not.

ACADEMIC HONESTY: Students can study with others, however, *all work turned in must be your own*. Violations of the [CU Student Honor Code](#) will result in an automatic final grade of F in this course and potentially more severe penalties. Note that copying solutions from internet resources (*e.g.* Wolfram Alpha, Desmos, Chegg, *etc.*), another student's work, a textbook, *etc.* is plagiarism, a violation of the CU honor code.

USEFUL WEBSITES: • [Exam Archive](#) • [Academic Calendar](#) • [Campus Policy on Final Exams](#)

TIPS FOR SUCCESS: Attending and being engaged in the lectures and recitations, working on written and online homework a bit each day (not procrastinating until the due date and without searching for answers online) as well as attending office hours to get help are all good ways to aid in being successful in the course.

This course is a sophomore level course. This means that the material is inherently more challenging than previous calculus courses and will likely require more time to understand and do the problems. To improve your problem-solving skills (part of what this course teaches you to do), it is in your best interest to use internet resources wisely. For example, graphing a three-dimensional object using an internet resource to aid in visualization is a good use of the internet. Reading a homework problem, not knowing what to do and then simply searching online for the answer is not a good use of internet resources and should be avoided. In these cases, you should attempt to tackle the problem for a while on your own, and then perhaps ask for help during office hours. Challenging yourself on your own while working through the homework is the best way to learn the material and prepare for the exams and quizzes.

For those students who have taken AP Calculus in high school, this course may very well be the first one containing material that you have not seen before. Consequently, you will be less able to rely on past experience and knowledge than you may have done in previous calculus classes. With that being said, you will probably need to spend more time outside of class on this course than in previous calculus courses, so plan accordingly. As a minimum, all students should consider devoting at least 10-12 hours per week outside of lectures and recitation to studying for this class (going over notes, reading the textbook, completing homework assignments, studying for exams, *etc.*)

Calculus 3 deals in three dimensions, making visualization of some problems challenging. However, this allows the beauty of mathematics to really shine through by applying math to the solution of a variety of real world problems. As a consequence, many of the problems in the course (homework, quizzes, exams) will be word problems, requiring students to put mathematics to work, rather than simply memorizing formulas and plugging and chugging answers out of those. These kinds of problems help prepare you to use mathematics in solving problems in engineering and science.

DROPPING THE COURSE: Advice from the Dean's office and your department adviser is recommended before dropping any course. After March 24, dropping the course is only possible with a petition approved by the Dean's office; click [here](#) for further information.

DISABILITY ACCOMMODATIONS: Students that qualify (via Disability Services) for accommodations need to contact the course coordinator eric.thaler@colorado.edu in a timely manner so that the appropriate arrangements can be made to grant the accommodations. Requests for accommodations that are received less than one week in advance of an exam or quiz may not be able to be granted for that exam or quiz.

CAMPUS POLICIES: For further information regarding university policies on a variety of matters see the file [CampusPolicies.pdf](#) in the Administrative module in Canvas.

Updated: 01.12.23 at 14:13:11 Mountain Time