Course: 223 - Vector Calculus
Instructor: Chris Jewell
Sections: 003 ; 12:00-12:50
Office: Math 318
Text: Multivariable Calculus 6th Ed.
    McCallum/Hughes-Hallet/Gleason et al.
    WebAssign access
Email: cjewell@math.arizona.edu
Office Hours: Tue 10:00–11:00
    Wed 3:00–4:00
    Fri 12:00–1:00
Websites: http://math.arizona.edu/~calc
    http://math.arizona.edu/~cjewell/223
    Mon 11:00–12:00 (tutoring room)

Course Objectives

Upon successful completion of this course, students should be able to:

• Recognize and sketch surfaces in three-dimensional space
• Recognize and apply the algebraic and geometric properties of vectors and vector functions in two and three dimensions
• Compute dot products and cross products and interpret their geometric meaning
• Compute partial derivatives of functions of several variables and explain their meaning
• Compute directional derivatives and gradients of scalar functions and explain their meaning
• Compute and classify critical points of two-variable functions
• Parameterize curves in 2- and 3-space
• Set up and evaluate double and triple integrals using a variety of coordinate systems
• Evaluate integrals through scalar or vector fields and explain some physical interpretation of these integrals
• Recognize and apply Fundamental theorem of line integrals, Green’s theorem, Divergence Theorem, and Stokes’ theorem correctly

Communication with Students

If it is necessary to make announcements or disseminate other important course information outside of normal class meetings, such information will be sent to each student’s official University email. It is the student’s responsibility to check for messages and announcements regularly.

Email communication is written communication and is expected to be conducted with the proper level of decorum. This does not mean that each email needs to be overly formal, but it does mean that an attempt at proper spelling, grammar and etiquette should be made. Please keep this in mind when initiating email contact.
Attendance

Students are expected to attend every scheduled class and to be familiar with the University Class Attendance policy as it appears in the General Catalog. Students who miss the first class meeting may be administratively dropped unless they have made other arrangements. In addition, students with more than 3 unexcused absences may be administratively dropped from the course. (See Administrative Drop Policy at http://catalog.arizona.edu/2017-18/policies/classatten.htm) If you need to miss class for unavoidable circumstances, contact your instructor as soon as possible.

Please note the following:

- All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion
- Absences pre-approved by the UA Dean of Students will be honored

It is the student’s responsibility to notify the instructor in advance of an absence related to religious observation or an activity for which a Dean’s excuse has been granted, and to arrange for how any missed work will be handled. It is also the student’s responsibility to keep informed of any announcements, syllabus adjustments or policy changes made during scheduled classes.

Withdrawal

A student may withdraw from the course (using UAccess) with a deletion from record through September 4, 2017, or may withdraw with a grade of “W” through October 29, 2017.

Academic Integrity

Students are expected to behave in accordance with the Student Code of Conduct and the Code of Academic Integrity. The guiding principle of academic integrity is that a student’s submitted work must be the student’s own. University policies can be found at http://deanofstudents.arizona.edu/policiesandcodes.

Expected Classroom Behavior

Students should turn off all electronic devices during class. This includes, but is not limited to cell phones, mp3 players, and laptops. If you have a disability-related accommodation that involves the use of a computer during class, please discuss this with your instructor in advance.
Other Relevant University Policies Relating to Conduct

Please take note of the following University policies:

- Policy on Threatening Behavior by Students:
  http://policy.web.arizona.edu/education-and-student-affairs/threatening-behavior-students
- Nondiscrimination and Anti-Harassment Policy:
  http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

Accessibility and Accommodations

It is the University’s goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or other limitations, please let me know immediately so that we can discuss options. You should also contact Disability Resources to establish reasonable accommodations.

Calculators

A graphing calculator is an important tool and will be helpful for much of this course. You may be required to complete some coursework without a calculator. Any calculator, including those which perform symbolic manipulation (such as the TI-89 or 92), is permitted on the final exam, provided it is not capable of wireless connectivity.

Grades

Breakdown of points: Grades will be no lower than those set forth in the following scale

<table>
<thead>
<tr>
<th>Breakdown of points</th>
<th>Points</th>
<th>Grade Range</th>
<th>Percentage Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework/quizzes</td>
<td>130</td>
<td>675 - 750 points</td>
<td>90 - 100%</td>
<td>A</td>
</tr>
<tr>
<td>Preliminary exam</td>
<td>20</td>
<td>600 - 674 points</td>
<td>80 - 89 %</td>
<td>B</td>
</tr>
<tr>
<td>In-class exams total</td>
<td>400</td>
<td>525 - 599 points</td>
<td>70 - 79 %</td>
<td>C</td>
</tr>
<tr>
<td>Final exam</td>
<td>200</td>
<td>450 - 524 points</td>
<td>60 - 69 %</td>
<td>D</td>
</tr>
<tr>
<td>Total possible points</td>
<td>750</td>
<td>0 - 449 points</td>
<td>50 - 59 %</td>
<td>E</td>
</tr>
</tbody>
</table>
Written homework assignments can be found by following the “Course Calendar/Homework Assignments” link from the course homepage. You will find a calendar view of the semester with links to the assignments, each in the form of a pdf file. You are expected to print the relevant assignment, and complete your work on those sheets.

On the course homepage, you will also find a link labeled “Suggested Problems”. This is exactly what the name implies: these are problems which should be done for your benefit, but will not be collected. They should not be taken lightly; Even though you will not receive any direct credit for the recommended problems, doing them will pay dividends. You will find the required problems much more bearable if you have first done the recommended problems which will usually form a basis for the more difficult required ones.

The computer aided grading program called WebAssign will also be used for homework in this course. The due dates for WebAssign homework can also be found on the “Course Calendar” mentioned above. Course content and assignments in WebAssign can be accessed via D2L (d2l.arizona.edu).

Of the 130 homework points in the course, written homework will be worth 80 and WebAssign will account for the remaining 50 points. At the end of the semester, roughly 10% of the lowest homework scores (including missing assignments) of each type will be dropped. Those subtotals will then be scaled to a score out of the appropriate number of points. Other in-class assignments or quizzes may also be given and counted in the written homework portion of the homework/quiz score.

Discussion of homework problems (“working together”) is encouraged, but each student is required to write his/her OWN solutions. Students are advised to seek help whenever needed and are encouraged to ask questions during office hours and to use the free tutoring available.

Specific homework procedures, policies, and instructor pet peeves involving homework can be found on the last page of this document.

**Homework is an essential component of the course, whether it is assigned for grading or not.** Do lots of problems!

The intent of the homework assignments is to give you some practice with the material and to provide an opportunity for feedback prior to taking an exam. You should treat all required and optional assignments and problems in this manner— it is a learning experience for you. Ultimately you are in this class to learn the material. It is a bad mistake to become overly (or only) concerned with receiving as many points as possible on each assignment. Obviously, everyone wants as many points as possible, but earning those points is best done as a consequence of knowing the material. It may sound overly cliché, but if you are only concerned with getting points by any means necessary (liberal use of “help” from other sources), you are ultimately only cheating yourself.
In-class Exams

There will be four in-class exams. All exams are closed-book and closed-notes, and no calculators will be allowed on the exams. Each test will be worth 100 points. The exact dates of the in-class exams will be announced in class at least one week in advance. Any questions regarding the grading of exams need to be cleared up within one week after the exam has been returned.

There will also be a 20 point Preliminary material exam given on Tuesday, August 28. This test will cover the algebra, differentiation and integration skills necessary for success in this course. The preliminary test is intended to give you (and your instructor) some information about your preparation level for this course. Calculators will not be allowed on this exam.

Missed Exams

Students are expected to be present for all exams. If a verifiable emergency arises which prevents you from taking an in-class exam at the regularly scheduled time, you must notify me as soon as possible, and in any case, prior to the next regularly scheduled class. Make-up exams will be administered only at the discretion of the instructor. If a student is allowed to make up a missed exam, (s)he must take it at a mutually arranged time. No further opportunities will be extended. Failure to contact me as stated above or inability to produce sufficient evidence of a real emergency will result in a grade of zero on the exam.

Final Exam

There is a comprehensive common final exam. The final exam is worth 200 points. The Final Exam is on Tuesday December 12, 2017 from 1:00 to 3:00 p.m. Do not arrange to leave town prior to this date as this exam will only be given on the date scheduled by the University. The University’s Exam regulations for final exam week will be strictly followed. More information and a study material can be found at http://math.arizona.edu/~calc.

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor. In particular, the dates of midterm exams, the number of exams, and the order in which topics are covered may differ from the dates and arrangement in the tentative weekly schedule.
Specific Homework Policies, Procedures, etc.

• Homework is due at the beginning of the class period. No exceptions. Homework is expected to be stacked by all students on a table or desk at the front of the room prior to the start of class.

• You are expected to print each assignment on standard $8\frac{1}{2}'' \times 11''$ blank white paper on which you will complete the problems.

• If you require additional space to complete the homework, you are expected to use additional sheets of white $8\frac{1}{2}'' \times 11''$ notebook or plain paper. No fringes or loose spiral binding.

• Multiple pages should be STAPLED together (with a single staple located in the upper left-hand corner), in order. Crazy corner origami is not a staple. A paper clip is not a staple. A binder clip is not a staple. Anything which is not a staple, is NOT A STAPLE.

• Solutions for each problem should be neatly written with all intermediate steps included. Written explanations should be included whenever appropriate. You need to show and explain all relevant work to earn full credit. A correct but unsupported answer will earn no credit.

• Answers should be clearly indicated (boxed, circled, highlighted, etc.).

• If your writing is illegible I will likely be unable to understand your solution and will be able to assign at most minimal credit. It is in your interest to write neatly.

• Notation is an important part of this class. Make sure you understand the notation and terminology and use them correctly. Incorrect use of notation is a common cause of lost points, so beware.

• Wherever practical, answers given should be exact (for example, $\sqrt{2}$ not 1.414), unless the problem asks you to estimate.

• If you have questions on the required or optional homework, do not hesitate to visit my office hours or email me. If you do email me, it is always helpful to include a description of what you have tried and what you are confused about. Questions such as “I am having trouble with number 7” are difficult to address directly.

• Do not use the paper you are going to turn in as scratch paper. Work you do not use may make your solution unclear and cause you to lose points. Instead, do the work on a separate sheet of paper and then carefully transcribe your solution onto the sheet you intend to turn in.

• You need to write solutions to problems. You are well beyond the level where simply “getting the right answer” is the entirety of the goal. I strongly encourage you to look at the handout (which can be found on the course webpage) titled “How to Write a Solution” for examples of what is expected, and what is not acceptable.

Failure to meet these requirements and guidelines will result in a loss of points or may cause an assignment to not be accepted.