

Math 251, Section 4, Fall 2011

Multivariable Calculus

- Instructor:** John Zweck
- Office:** MP 424
- Email:** zweck@umbc.edu
- Webpage:** I will maintain a web page for the course, linked from my web page www.math.umbc.edu/~zweck I will also communicate with you using a class email list. (I do *not* use Blackboard.)
- Phone:** (410) 455 2424 (Do not leave a message. Email me instead.)
- Fax:** (410) 455 1066
- Lectures:** TuTh, 11:30am-1:20pm (BIOL 120). There will be a 10 minute break about half way through each lecture.
- Text:** "Calculus (Early Transcendentals)", Sixth Edition, by James Stewart, Chapters 12-16
- Online Resources:** I encourage you to make use of the online video lectures and other resources developed by MIT¹ and the Khan Academy².
- Prerequisite:** Math 152 with a grade of C or better. In general, success in Math courses strongly depends on your grade in previous relevant courses. If in the first four weeks of class you feel the need to (re)-take a prerequisite, the Mathematics Department can arrange for you to switch without penalty after the last day to add classes. *For Math 251, the material in Math 151 (Calculus I) is more important than that in Math 152 (Calculus II).*
- Material Covered:** The course will cover the following sections of the textbook: 12.3-12.6, 13.1-13.3, 14.1-14.8, 15.1-15.4, 15.6-15.9, 16.1-16.9. Students are expected to review 12.1 and 12.2 for themselves. In addition, if time permits there will be an overview of how Multivariable Calculus is applied to study Maxwell's equations which describe the propagation of light.
- Office Hours:** M 1:00-2:00, Tu 2:30-3:45 *and by appointment*. If you cannot come to my office hours *please* contact me in class or by email to set up a time to meet. Also, you can ask me questions by email.
- Calculators:** No calculators will be allowed on exams. Although you won't need to, you can use a scientific calculator for homework.

¹<http://ocw.mit.edu/courses/mathematics/18-02sc-multivariable-calculus-fall-2010/>

²<http://www.khanacademy.org/>

Study Groups: In the first week of class I will organize students into study groups.

Drop Deadlines: The first drop day is Sept. 14th, after which it is impossible to drop without a “W”. The second and last drop day is Nov. 14th.

Learning Goals

See *Course Objectives for Teachers and Students of Math 251* on my web page at

<http://www.math.umbc.edu/~zweck/TeachingPast/M251Objectives.html>

Academic Misconduct

I will not tolerate cheating in any form. All instances of cheating I discover will be reported to UMBC’s academic integrity committee. (See <http://www.umbc.edu/integrity/>). Depending on the severity of the offense, I reserve the right to assign a failing grade for the course to students who cheat. At a minimum, giving or receiving aid on exams will result in a grade of zero for that exam. Copying of homework solutions from other students in the class, from students who have previously taken this or an equivalent course, from a solutions manual, or from the web will be treated as a serious offense. I reserve the right to give a grade of zero for the homework on which the student was found to have cheated as well as on all homeworks that were turned in **prior** to the discovery of the offense. Also see comments below in the subsection on Homework.

Here is a summary of UMBC’s official policy on academic misconduct, which I fully endorse:

By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC’s scholarly community in which everyone’s academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the *UMBC Student Handbook*, the *Faculty Handbook*, or the UMBC Policies section of the *UMBC Directory*.

Grading

Grades: Study Plan Essay 0%, Homework 10%, Midterm One 20%, Midterm Two 20%, Midterm Three 20%, Final 30%

Study Plan Essay: Due at start of class on Tuesday Sept. 6th. *Students who do not complete this assignment will receive a grade of ZERO for all homework for the entire course.*

See <http://www.math.umbc.edu/~zweck/M251F11/StudySkillsHwk.html>.

Homework: There is a strong correlation between homework grades and performance on exams. There will be required and recommended homework problems posted on the course web page for each day of class. *Required problems* assigned on TuTh will be due at the *start* of class the following **Thursday**. At least some of them will be graded. Make sure your homework paper is *stapled*. *Recommended problems* will not be graded. However, since the only way to learn math is to do it, you are expected to do the recommended problems, and **some of them will appear on the exams!** *No late homework will be accepted!* Your lowest two homework grades will be dropped. You may ask me questions about the homework and you may collaborate with another student in the class. In fact you are encouraged to do so! However the final write up is your own – *two identical homework papers will both be given zero*. I do not encourage large groups of people to work together on homework. Do not miss class to complete a homework. *I will not accept homework that is handed in after the first few minutes of class.*

Midterm Exams: There will be three midterm exams, each **65 minutes at the start of class**.

- Midterm 1: Thursday Sept. 29th, on 12.3-12.6
- Midterm 2: Thursday Oct. 27th, on parts of 15.7 and 15.8; 13.1, 13.2, 13.3, 14.1-14.7, 16.6.
- Midterm 3: Tuesday Nov. 22nd, on 14.8, 15.1-15.4, 16.1-16.5.

Final Exam: Thursday Dec. 15th, from 10:30-12:30 in BIOL 120. The final will be based on the whole course.

Making up an exam you missed

If you miss one of the midterms you *may* be given the chance to take a make up exam. To request a make up you should speak with me **no later than 48 hours after** the exam time. Generally speaking, you will be offered a make up if you are sick or if a close relative or friend is gravely injured/sick or dies. However I will listen to all reasonable requests. Be prepared to bring appropriate evidence in support of your request. **There will be no make ups for the final exam.**

How I assign final grades

For each exam I work out how many points I expect a student who has a solid understanding of the material to get. I tend to put the bottom B near this score. Then I work out where to place the bottom A,C,D using the grade distribution and by looking at individual exams. I also work out the bottom A,B,C,D for the homework. Then I take an imaginary student who got the bottom B (say) for each component of the course and calculate their score. If

your score is higher than the imaginary student's you get a B. To decide on the grades of borderline students I look carefully at performance on the final exam. In brief, I reward "strong finishers" who can show me they have a solid understanding of the entire course.

Study Tips

1. Read the results of a survey I did on "*Study Habits and the Transition from High School to UMBC*" which can be found on my web page³ and find a strategy that works for you.
2. Attend class every day. **Do not skip the second half of class.** A study in the Math Dept at the University of Texas has shown that for every class a student misses their grade falls by about 10%.
3. Learn the art of taking good notes. My lectures usually present a complementary perspective on the subject to that in the textbook. **I test what I teach!** So you need a detailed record of what was discussed in class.
4. You should spend *at least* 10-12 hours a week on this course outside of class time.
5. Begin each hwk assignment *the same day* that we cover the material in class. If you do this you will understand the next lecture much better!
6. **Warning:** This course gets harder as the semester progresses. My experience is that student who receive a C on the midterms are in grave danger of getting D/F on the final and in the course. **To do as well as you can, I strongly encourage you to come to see me with specific questions on a regular basis.**
7. On the course web page I will post the sections that we will cover each day. **You are expected to read the section ahead of time.**
8. It is very important to keep the main definitions, statements of theorems, and simpler examples in the forefront of your mind throughout the course, since we will refer back to them many times. You will need to digest the material several times to master it — before class, in class, reading through material after class, rederiving for yourself without any aid results discussed in class, and doing the assigned problems.
9. This is a fast paced course. Do not get behind. Do not miss class. If you miss a class or start to get lost, it will only be a week before you are totally lost. So ask for help from me and from your fellow students immediately!
10. I encourage you to **ask questions** both in and out of class. If you are dazed and confused most likely most of your class mates are too! So you'll be doing everyone a favor by asking your question.
11. In class I call on people by name to answer questions. This is to keep you involved and helps me find out whether you are understanding what's going on. **If you do not feel comfortable being called on in class, please come and talk with me, and we will find another way to actively involve you.**
12. Come and talk with me in my office. Talk math with your fellow students, don't work in isolation.

³See <http://www.math.umbc.edu/~zweck/TATrain/StudyHabits.html>

Advice for Homework

1. **Never start your homework the day before it is due!!**
2. Do *all* the hwk problems. Work out what your mistakes are on the graded hwk and learn from them.
3. If you get stuck on a problem get help and get it before you waste too much time!! Here are some places you can go for help.
 - Carefully read the book (again!).
 - Ask me for help by email or in person.
 - Ask a fellow class member – often two heads are better than one! I encourage you to find a study partner and/or actively participate in a study group. First attempt the hwk yourself, then discuss them with your study partner, and finally carefully write the solutions up in your own words.
 - Sleep on it. Some of my best ideas come when I wake up in the morning.
4. My Dad used to say “You can’t do maths on a postage stamp”, so use lots of paper. Write your solutions up neatly *after* working out the problem on scrap paper. Apart from anything else, this helps you organize your thoughts and therefore learn the material better.
5. I’ll teach you by example how to write up your solutions in a connected step-by-step fashion with explanatory sentences. *You should aim to write up solutions so that you’ll easily understand them in a month’s time when you’re studying for the exam!*
6. Some of the homework problems will be harder than others. Don’t expect to solve them all on the first try!
7. **If your homework grades are not as high as you’d like you should arrange to meet with me for 15 minutes at a fixed time each week. We will use this time to discuss what you did wrong on past homeworks and also check how you are doing on the current homework. Don’t wait until exam time!**

Advice for Exams

A large collection of **past exams** are on the course web page together with some solutions. *Do as many as you can!*

Exams will include problems similar to those in the homework and in lectures as well as examining theory covered in class (definitions, theorems, concepts, examples). *You will not get any credit for an answer unless you also show how you arrived at that answer.* Some questions will be similar or even *identical* to homework questions. Others will look a little different from those you have seen before and will test whether you really understand the *concepts* we have discussed in class. At least one question on each exam will involve *written explanations* of the *theory* we discuss in class. For example, I may ask you to explain some of the more important fundamental concepts or to carefully state some of the most important theorems.

I encourage you to first master the theory and memorize calculation methods and formulae you need to know and then use this knowledge to work a range of problems *without looking at your notes*. To learn theory, calculation methods, and formulae go through your notes and the book and write down a detailed list of topics you need to know. Then with your lecture notes and book closed write down what you know about each topic, as precisely and succinctly as you can. Only when you get stuck should you look at your lecture notes. If you do this about 4 times in the 10 days prior to the exam you should be in good shape. Don’t forget to work lots of problems as well!

You should also spend *some but not all* of your preparation time studying in small groups to learn from each other. Presenting material to someone else is often the best way to work out whether you really know it yourself.