Math 249: Multivariable Calculus
Fall 2013
Course Procedures

Professor: Josh Laison
Ford 215, x6689, jlaison@willamette.edu

Office Hours:
Monday 3:00–4:00
Wednesday 3:00–4:00
Thursday 9:30–11:30, at the Bistro
or anytime by appointment or by catching me in my office. You can see my schedule and available times at http://www.willamette.edu/∼jlaison

Class Meetings: Ford 301, 10:20-11:20, Monday, Wednesday, Friday

Drop-In Math Lab Help: The math hearth
(probably) 6:30-9:30 PM, Sunday through Thursday

Text: Multivariable Calculus, McCallum, Hughes-Hallet, Gleason, et al., 5th or 6th edition
Course Web Page: http://www.willamette.edu/ jlaison/multi.html
WeBWorK Page: https://secure.willamette.edu/webwork2/Math249-Laison

Grading:

WeBWorK Assignments (approximately 35)	30%
Quizzes (approximately 4)	30%
Final Project	15%
Final Exam	20%
Class Attendance and Participation	5%

Material Covered: We will cover basically the whole text. Note that the topics in the last few chapters are the most exciting, including what are commonly known as the "fundamental theorems of multivariable calculus", Green's Theorem (18.4), the Divergence Theorem (20.2), and Stokes' Theorem (20.4), so we have to make sure to get there by the end of the semester! To that end, we might skip over a few other sections, such as Sections 15.3, 16.6, 16.7, and 19.3. The material is roughly organized into the following topics:

- Functions of several variables (Chapter 12), their derivatives (Chapters 14 and 15) and integrals (Chapter 16).
- Parameterized curves, parameterized surfaces, and vector fields (Chapter 17), their derivatives (still Chapter 17), and integrals (Chapters 18, 19, and 20).

Course Goals:

- Learn about multivariable functions, their derivatives and integrals.
- Improve your geometric visualization in three dimensions.
- Improve your problem-solving, logical, and analytic skills.
- Gain mathematical sophistication in thinking about problems more abstractly, and within a larger theoretical framework.
- Improve your ability to communicate mathematical ideas verbally and in writing.
- Gain skills applying the tools of calculus in other disciplines, particularly physics and economics.

Ways to Get Unconfused:

- I encourage you to find classmates to work together with on homework problems and to study for quizzes and the final, even if you're not confused!
- Find me in my office during my office hours or at other times, and I will be more than happy to answer questions. Feel free to hang out in the math hearth or in my office and work on homework there. These are great places to meet other calculus students and work together, and I will be easily available for questions.
- Come to the evening group study sessions held by the math department in the math hearth. Math majors are paid by the department to hang out and answer math questions 5 nights a week. These are also great places to form study groups.
- If you're working on a WeBWork problem, use the "E-mail Instructor" button to ask me a question.

Homework Assignments and WeBWorK: Homework will be assigned almost every day of class. Homework assignments will consist of a few problems on WeBWorK, and a few problems from the textbook. The problems from the text will not be turned in or graded, but some of them (or slight variations of them) will appear on quizzes.

WeBWorK is an online homework system. When you enter a correct solution to a homework problem, it will immediately tell you the solution is correct, and give you credit for it in your grade. If you enter an incorrect solution, on most problems you will have the opportunity to go back and try the problem again, and it won't be counted against you.

Tips on using WeBWork:

- Your initial username and password are your Willamette email (before the @) and your student ID number.

- Get started early, and try the problems before the day they're due. That way you will have time to seek help. Also, avoid the danger that the system might become overloaded and slow right before an assignment is due, if everyone is trying to enter their answers at the same time.

- WeBWorK usually requires very precise answers. For instance, if the correct answer is 1.60045 and you enter 1.6, the system might say that's incorrect. If you are entering a decimal answer, give at least 5 digits of accuracy. On most problems, you can enter answers like cos(9sqrt(340)) instead of a messy decimal, and WeBWorK will do the calculation for you.

- For expressions such as (x + 3)^2, be careful with parentheses. Note that x+3^2 is not the same thing, and would be considered incorrect. Assignment 0 will give you practice entering expressions like this. Also, you can make use of the "Preview answers" option to see that you've used your parentheses correctly.

- Don't spend time guessing random answers and entering them into WeBWork. This is a waste of your time! If you can't figure out a problem, see the list of ways to get unconfused above.

Quizzes: The quizzes will be in class every three to four weeks, and will take about 45 minutes each. They will be designed to test your understanding of the assigned homework problems, with an emphasis on the (ungraded) problems from the textbook. They will also emphasize conceptual understanding over calculation, so calculators will probably not be needed to take the quizzes.

Final project: The final project is an opportunity for you to apply your newly acquired calculus skills. Your team of two students will submit a paper and create a poster to display in a class poster session near the end of the semester. The topics of the final projects will be chosen from a selection of multivariable calculus applications to other academic disciplines and to industry. Your group will be asked to research these topics, and some resources will be provided to you. Treat the final project as you would a written assignment in any other course – your writing and the quality of presentation of your poster will be components of your grade.

More information on the final project, including a list of suggested topics, will be available soon.

Technology: Technology is a valuable tool in solving mathematical problems. You are encouraged to use technology when it might help, and we'll spend some time in class talking about how to use it and when it's appropriate. We'll use a variety of tools, including calculators, wolframalpha, Maple, web applets, etc., since different tools will be helpful at different times. These tools are good at getting a number or expression solution to a problem, but bad at determining whether that solution is reasonable, explaining what it means, or fitting it into context. So, you should work to develop these skills, and the quizzes, project, and final will emphasize them.

Collaboration: Working with others is an important part of many academic endeavors. Too little collaboration can make the learning experience more frustrating and less productive.

Too much collaboration could be interpreted by your professor as cheating and incur severe penalties (see *Academic Honesty* below). Part of becoming a good college student is learning the level of collaboration appropriate for each assignment. Here are two important things to keep in mind as you seek that appropriate level:

1. Your professors may have a different socially accepted idea than your fellow students of what constitutes too much collaboration. Use your professors' standard, not your peers'.

2. Do not assume that you should work alone unless you encounter difficulty in the course material. Working with classmates, even when you're both doing well in the course, is often helpful, a normal part of college life, and not a sign of weakness!

Attendance at the Math Department Colloquium: According to math department policy, since you are enrolled in a 200-level mathematics course, you are required to attend at least 2 mathematics department colloquium talks. The goal of this requirement is to expose you to a wider range of mathematics, and to make you want to go to more than 2 talks! I hope you will decide by the end of the semester, as I have, that math talks are a lot of fun. If you miss this requirement, points will be deducted from your final grade.

Late Assignments and Missed Classes: I expect everyone to attend all classes and turn in all homework assignments on time. Unfortunately, it is inevitable that some people will have crises during the semester that will prevent them from turning in homework on time. If this happens to you, talk to me about it, and I will generally be sympathetic.

Note that I cannot accept late WeBWorK assignments after solutions have been posted.

Disabilities: If you have a documented disability for which accommodations may be required in this class, please contact me to discuss your needs. Additionally, you will need to register with Disability and Learning Services in the Bishop Wellness Center within the first two weeks of class. All such discussions will be confidential.

Academic Honesty: Cheating and plagiarism are serious offenses and will be treated severely, in accordance with college policy. In addition, I am personally insulted by such behavior. So please don't do it. These are the practices I expect you to follow in each of the components of the course:

on homework: You may, and are encouraged to, discuss the homework with anyone, get help from technology, your textbook, etc. However, you should still complete your problems yourself. Having someone type solutions into WeBWorK for you is cheating.

on the final project: The members of the group should contribute equally to producing the final product. Do not put your name on work written by others. This includes copy/pasting work from a text or webpage and claiming it as your own.

on quizzes and exams: The resources that you may use on each quiz/exam will be different, and will be specified on the quiz/exam and earlier in class by me. You will never be allowed to receive aid from others. Copying others' work, or providing your work to be copied by other students, is cheating.