Math 161 - Calculus I - Sections 1 and 2 - Spring 2016

The sequence Mathematics 161, 162, 263 provides an introduction to calculus for students of mathematics, engineering, and the sciences. Topics include limits, derivatives, techniques of differentiation, definite integrals, the fundamental theorem of calculus, and applications of derivatives and integrals.

The student work in this course is in full compliance with the federal definition of a four credit hour course. Please see the Lafayette College Compliance webpage for the full policy and practice statement.

Instructor information

Jonathan Dahl
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Office hours: MWF 11–11:50, W 8:30–9:20, or by appointment
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Basic course information

Meeting times: MWF 9:30–10:45 (Section 1, Oechsle 211) 1:15–2:30 (Section 2, Pardee 227)
Textbook: Calculus by Stewart, Edition 7E. We will cover Chapters 1–4 and the first half of Chapter 6. Please keep this book if you plan to take Math 162 in the future.
Grading: WeBWorK (10%), quizzes/worksheets (15%),
three midterm exams (15% each),
final exam (30%).
In-class exams: Friday, February 19 (roughly up to 2.5 in Stewart),
Wednesday, March 30 (roughly up to 3.9),
Friday, April 22 (roughly up to 4.5).
Final exam: TBA (Don’t make travel plans before we get the exam schedule!)
Calculators: You will be asked on occasion to use a scientific calculator or something similar while working through a problem. If you do not already have such a calculator, you should be able to simply use a computer or smartphone connected to the internet. I plan to have us in the computer lab whenever you would need this in class. Calculators, computers, phones, and similar electronic devices are prohibited for use on quizzes and exams.

Detailed course information

Math 161 serves as an introduction to the derivative and the integral, their applications, and their remarkable interactions. We will discuss topics as varied as optimization and area computation,
discovering not only an interplay between them but a whole new mathematical language to work with them.

Meetings: We will meet for 75 minutes three times a week. In order to help you get the most out of this time, I will update you regularly on future topics. I strongly encourage you to read the corresponding section of the textbook before we work on material in class. Students often only discover their points of confusion and useful questions after a second (or third or fourth...) encounter with a topic, so it helps to schedule such that I am around then.

WeBWorK and homework problems: We will use the WeBWorK online homework system. This allows for instant feedback on your work and gives you the opportunity to revise and correct your work until the posted deadline.

I will also list selected problems from the textbook to work on. These problems will not be collected, but will give you direction in additional practice. In general, I expect the WeBWorK problems will not be enough practice to master the material.

You are encouraged to discuss these problems with me and with each other.

Attendance, worksheets, quizzes: You are expected to attend all class meetings. Please let me know if you can’t make it to class, with prior notice where appropriate. An absence will be excused if it is caused by illness properly reported, by an emergency properly reported, or by participation in a recognized collegiate activity. Proper reporting includes advance notice, whenever possible. An unexcused absence will result in a 0 for missed work.

Learning outcomes:
1. Students will be able to perform the fundamental computational techniques of calculus.
2. Students will understand the basic concepts and vocabulary of calculus.
3. Students will learn to use symbolic, graphical and numerical methods in an integrated way to investigate and solve problems in various contexts.
4. Students will learn to formulate problems in mathematical terms.
5. Students will develop their ability to learn mathematics.

Ideas to be discussed and skills to be acquired:
1. An intuitive understanding of the limit of a function.
2. Know and be able to apply the limit definition of a derivative.
3. The geometric intuition to estimate $f’$ given the graph of $f$.
4. Know the derivatives of power functions, trigonometric functions, and exponentials & logarithms.
5. Know and be able to apply the formulas for derivatives of linear combinations, products, quotients and compositions of functions.
6. The relationship between $f$, $f’$, and the graph of $f$.
7. Be able to compute extreme values of functions, including functions on closed intervals, and solve optimization word problems.
8. Be able to compute elementary antiderivatives.
9. An intuitive understanding of definite integrals as limits of sums of rectangles.
10. The fundamental theorem of calculus.
11. $u$-substitution.
12. The integral calculus of power functions, trigonometric functions, exponentials & logarithms.

Academic honesty: I expect all students in this course to be honest in all of their academic work. Your further participation in this course is a tacit agreement to commit to acting in an honorable fashion in this academic community and signifies your understanding that your failure to comply with this commitment may result in disciplinary action. I am required to report every suspected case of academic dishonesty to the Dean of the College. Penalties for academic dishonesty are often quite severe.
Homework and in-class group work are collaborative exercises. You should confer with other students and with the instructor while working on these assignments. However, it is expected that in all cases the final product handed in for evaluation of your work will be your own. You may not copy or paraphrase the work of another student, nor should you use another student's work as a model for your own.

During examinations and quizzes, you must not confer with other students, look at their papers, or use any unauthorized sources of information. Additionally, you may not allow another student access to your work. It is also dishonest to seek information about an examination from another student before taking a make-up examination.

See the Student Handbook for a complete statement of the College's Policy on Academic Honesty.

**Special arrangements:** If you need disability-related accommodations in this class, if you have emergency medical information you wish to share with me, or if you need special arrangements in case the building must be evacuated, please inform me immediately. Please see me privately after class or at my office.

**Help**

**Office hours:** My office hours are MWF 11–11:50, W 8:30–9:20, or by appointment. Please do not hesitate to take advantage of this time. I want everyone to succeed and a stitch in time saves nine. My office is 210 Pardee Hall.

You may also email me questions (dahlj@lafayette.edu), although discussing mathematics via email can be tricky at times. I will try to answer quickly if it seems reasonable to, but sometimes we will just have to schedule time in front of a chalkboard.

Finally, feel free to ask me questions if you see me in my office or around campus. Surprisingly, I'm a big math nerd and like to talk about calculus.

**Tutoring:** Free tutoring sessions (held by the Calculus Cavalry) are open to anyone on a walk-in basis. All sessions are in Pardee 218. The tentative schedule is:

- Sunday, Tuesday, Thursday 4–6 pm
- Monday, Wednesday 7–9 pm

I will update you with an official schedule once it is set.

In addition, the ATTIC provides help with study skills and time management and can arrange an individual tutor for you if you feel that would be helpful. They will ask if you have sought my help and utilized the Calculus Cavalry, so you must first take advantage of these resources.