Math 221: Calculus I

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Textbook: *Calculus Volume 1,* by Strang and Herman (openstax.org/details/calculus-volume-1)

Course Info: Math 221, Calculus I, is the first semester course of the calculus series and is intended as a development of single-variable calculus. We will cover mostly differential calculus and give an introduction to integral calculus. Differential calculus is a mathematical method for analyzing how things change. Change is measured by slopes, velocities, acceleration, and, in general, derivatives. The precise definition of an instantaneous rate of change requires an understanding of limits, a notion that also leads to the understanding of what is meant by a continuously changing quantity. Techniques like the product, quotient, and chain rules enable efficient computation of derivatives that can then be applied to, among other things, the analysis of motion, rates of change, optimization problems, and understanding the shape of a graph. Our study of integral calculus, which is an important tool for applications in all parts of the natural sciences, engineering and economics, will begin with the basic concept of an integral and how it is used to find areas. We will cover the definition of integration and the substitution method of integration. Throughout the course, we will discuss applications of these techniques to problems coming from other disciplines.

Upon successful completion of this course, a student will be able to:

- Compute limits and derivatives of algebraic, trigonometric, inverse trigonometric, exponential, logarithmic, and piece-wise defined functions;
- Compute definite and indefinite integrals of algebraic, trigonometric, inverse trigonometric, exponential, logarithmic, and piece-wise defined functions;
- Determine the continuity and differentiability of a function at a point and on a set;
- Use the derivative of a function to determine the properties of the graph of the function and use the graph of a function to estimate its derivative;
- Solve problems in a range of mathematical applications using the derivative or the integral;
- Apply the Fundamental Theorem of Calculus; and
- Use appropriate modern technology to explore calculus concepts.

Grading: There will be regular homework assignments, three midterm exams, and a final exam. Your overall grade will be determined as shown below. **Exams** will be given during class. Exams are closed book, closed notes, closed friends, and open brain. Phones and other electronic devices will NOT be permitted in exams. Q**uizzes** may be given from time to time and will be based on material from homework and previous lectures. **Class participation** will be based on your willingness to **ASK and ANSWER questions** in class.

Homework, Quizzes, Class Participation	12%
Exam 1:	22%
Exam 2:	22%
Exam 3:	22%
Final Exam:	22%

** See course website for exact exam dates.*

	B+…87-89	C+…77-79	D…60-69
A…93-100	B…83-86	C…73-76	F…Below 60
A-…90-92	B-…80-82	C-…70-72	

In all written work, you must show your work neatly and legibly in order to receive credit. You should clearly show the process and reasoning you went through in order to solve the problem. The problems I work for you in class will provide good examples of how your homework and exam problems should be written up. All assessment will be based on your ability to communicate a correct solution and explain your reasoning. It is absolutely essential to write clearly and completely. It is your responsibility to write in a way that tells me that you understand the problem and its solution.

Homework: Most homework will be done through the internet-based homework system called WeBWorK. However, there may occasionally be problems you must write out and hand in to me. All assignments must be completed by the given due date. Check the WeBWorK website regularly to see if an assignment is due soon. To receive credit, assignments must be completed on time. **WeBWorK extensions will NOT be given without a legitimate excuse.** Complete as much of the assignment as you can by the deadline to receive partial credit. If you have a legitimate conflict, you must tell me ahead of time.

Each student is responsible for completing his or her own WeBWorK assignment and any written assignments. However, **you are strongly encouraged to discuss the homework and to work together on the problems with your classmates.** Please be careful that you are actively participating in the process: many students find that they can understand a problem while they are watching a classmate work through it and explain it, and then conclude that they understand the material well enough. This leads to an unpleasant surprise at test time, when students who "thought they understood" the material find they are unable to work the problems on their own. Please be careful that you are able to work all of the problems on your own before the exam time arrives, with no coaching from a friend. Please use whatever resources aid you in learning the material, including computer assistance, office hours, other students, professors, other math books, etc.

Moreover, while it is not required that you complete a handwritten version of WeBWorK assignments, it is strongly encouraged. Writing a problem out by hand, showing all calculation steps, and keeping them collected in a notebook will greatly assist you as you prepare for exams.

Extra Help: There are many ways for you to get some help in this class. I am willing to spend a few minutes in class answering questions about homework problems. However, if you have many questions, I recommend taking advantage of my office hours. I will say it again…USE MY OFFICE HOURS! My job is to help you -- come to office hours even if you have just a small question. Do not wait until you get too far behind. If my office hours are not convenient for you, make an appointment by sending an email or asking after class. Please come see me as soon as you feel lost -- it is important that I know how you are doing so I can adjust the level of the class if necessary. I WANT to help you, and I WANT everyone to do well. There is also help available in the Math Learning Center (South Hall 332).

If you have specific questions about a Webwork problem, you can use the “Email instructor” button at the bottom of the page for each problem. Push this button and it will take you to a page where you can send me a question. I will answer your questions as quickly as possible, but please do not expect a timely email response at night or on weekends.

Do not let yourself get too far behind! I would be happy to see you if you feel you need some assistance. Come and get your questions cleared up right away.

Please Note: *Any student with a disability requiring accommodations is encouraged to contact me after class or during office hours. All discussions will remain confidential.*