MATH 1131Q Fall 2015

Brief course description: This course focuses on techniques and applications of differential calculus and an introduction to integral calculus. Concepts will be treated from a geometric, algebraic, and numerical perspective.

Topics Covered: Sections to be covered from the text are in Chapters 1 through 6. A course outline in a weekly chart is here. Since lectures are twice a week, usually half the weekly material will be covered in each lecture. You are strongly urged to read the book *before* the corresponding lecture in the class and to use office hours of the instructor and TAs, as well as the Q Center to get help. *The pace of this course is not slow*. If you blow off class for a week, you may find yourself completely lost and it can be hard to catch up. Make sure to get any misunderstandings about the material cleared up right away!

Prerequisites: Precalculus. The hardest issue students usually have in calculus is not the new topics in calculus, but rather the constant use of precalculus. If you find your familiarity with precalculus to be inadequate, make sure to seriously review the material. Use the Q Center as well as resources (videos, flashcards, clicker questions) for Math 1131 and Math 1060 here (requires NetID and password to access).

Textbook: See the common course page.

Lecture notes: These will be available at the page for the large lecture (section 160) in HuskyCT.

Homework: Your homework problems will be done using WebAssign, which you will access from your discussion section page for Math 1131 on HuskyCT. Most, but not all, homework assignments in WebAssign have an accompanying timed quiz in WebAssign.

Clickers: During most lectures there will be some questions that you answer using clickers. Information about registering your clicker is on the common course page.

Quizzes: In your discussion section there will be a short in-class quiz once a week, except during the first week and during midterm exam weeks. For these in-class quizzes **no calculators are allowed**. If homework questions are used on in-class quizzes they may be slightly altered (*e.g.*, different numbers are used).

Exams: See the common course page for exam information (dates, rooms). If you need exam accommodations based on a documented disability, you need to speak with both the Center for Student Disabilities and the course instructor *within the first two weeks* of the semester.

Course grade: On the common course page is a breakdown of how much different parts of the course contribute to the course grade (including clickers, quizzes, and exams).

Makeup policy: Late work will **not** be accepted.

Course conduct: To respect everyone's right to a productive learning environment, you do not want to distract yourself or your classmates. Please refrain from disruptive activities during lecture and discussion section. On a positive note, do feel free to ask questions!

Learning Tips:

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- Come to every lecture and discussion section on time and stay for the entire time. The course is cumulative: what we learn will probably be used later. (In the event that the main lecture is cancelled, the material may be taught in the following discussion section.)
- To help you concentrate during lecture, don't sit with your friends. Consider also sitting closer to the front.
- Focus on trying to understand the material being discussed. If you are confused, raise your hand and say clearly "Question!"
- Write thorough notes and review them after class. Be sure that after class, when you review your notes, you can carry out all calculations done in class.
- Read the text (explanations and worked examples) before doing the homework.
- It is a mistake to skip homework, because no skills can be learned by passive involvement, but only by regular practice. Think about how often the UConn basketball teams drill basic moves and shots, even if they play a game just once a week. Do you think they practice only once a week? And do they wait to cram all their practice until the night before a game? Skills are learned best over *time*; you can't learn several weeks of material from this course only right before a test.
- The only way to learn calculus well is to solve *lots* of problems, and more is better than less if a fluent command of the material is your goal.

Calculators: On the exams you may use calculators below a TI-89, but not TI-89 or something higher. Do not let the calculator become a mental crutch as you try to understand the *ideas* of this course, most of which actually have nothing to do with calculators. You should regard the use of a calculator somewhat like that of a dictionary or grammar table for another language. Someone who needs a dictionary to translate even the simplest part of a basic French text or to hold a conversation in French does not know French that well. Of course properly using and understanding the French language means a lot more than just knowing French words and how they are inflected, but such knowledge *without outside aids* is an important prerequisite to becoming *comfortable*with French. In the same way, your comfort in this course will increase if you can handle certain *basic* computations quickly in your head. These include:

- knowing the values of some basic trigonometric functions at special numbers; at *least* know the sine and cosine of 0, $\pi/2$, and π. If you don't know why these are *easy* to know, please ask!
- multiplying small numbers (like 2 times 6, 3 times 9, or 4 times 7)
- simplifying small fractions (3/6 is 1/2 and 8/12 is 2/3)
- knowing the relation between dividing and multiplying, for instance multiplying by ½ is the *same* as dividing by 2
- knowing approximate values of certain numbers: π is around 3.14, $\sqrt{2}$ is around 1.414 and $\sqrt{3}$ is around 1.732 (note: George Washington was born in 1732; a student from Math 1132 once used this mnemonic device)

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Academic integrity: Students are expected to avoid academic misconduct. Your integrity is not worth losing (and the course not worth failing) by falsely presenting yourself in any aspect of this course. For further information on academic integrity, see Appendix A of the Student Code.

Some links

The Q Center: main page, schedule by course and by topic, and other tutoring.

Handouts

Tips for using WebAssign.

Differentiation rules explained.

Trigonometric derivatives explained.

Linearization and differentials.

Review of properties of logarithms.

Recent Announcements

5/20: Course page created

9/1: Course starts.

9/23: Handouts on differentiation rules and trigonometric derivatives posted.

10/8: Handout on linearization and differentials posted.

Credit: I respectfully stole the code for much of this page from its original designer, Glenn Tesler. Thanks, Glenn!

Outline

Week	Date	Section	Topic	Learning Activities
1	8/31		Administrative Information	

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Week	Date	Section	Topic	Learning Activities
		2.1	The Tangent and Velocity Problems	Video, flash cards
		2.2	The Limit of a Function	Video, flash cards
2	9/7		Labor Day	
	9/9	2.3	Calculating Limits Using the Limit Laws	Video, flash cards
		2.4	The Precise Definition of a Limit	Video, flash cards
		2.5	Continuity	Video, flash cards
3	9/14	2.6	Limits at Infinity; Horizontal Asymptotes	Video, flash cards
		2.7	Derivatives and Rates of Change	Video, flash cards
		2.8	The Derivative as a Function	Video, flash cards
4	9/21	3.1	Derivatives of Polynomials and Exponential Functions	Video, flash cards
		3.2	The Product and Quotient Rules	Video, flash cards
		3.3	Derivatives of Trigonometric Functions	Video, flash cards
5	9/28		**Midterm 1/Review**	Practice Exam
		3.4	The Chain Rule	Video, flash cards
6	10/6	3.5	Implicit Differentiation	Video, flash cards
		3.9	Related Rates	Video, flash cards
		3.10	Linear Approximations and Differentials	Video, flash cards
7	10/12	1.5	Inverse Functions and Logarithms	Video, flash cards
		3.6	Derivatives of Logarithmic Functions	Video, flash cards
		3.8	Exponential Growth and Decay	Video, flash cards

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Week	Date	Section	Topic	Learning Activities
8	10/19	4.8	Newton's Method	Video, flash cards
		4.1	Maximum and Minimum Values	Video, flash cards
		4.2	Mean Value Theorem	Video, flash cards
9	10/26	4.3	How Derivatives Affect the Shape of a Graph	Video, flash cards
		4.4	Indeterminate Forms and l'Hospital's Rule	Video, flash cards
		4.7	Optimization Problems	Video, flash cards
10	11/2		**Midterm 2/Review**	Practice midterm
		4.9	Antiderivatives	Video, flash cards
11	11/9	5.1	Areas and Distances	Video, flash cards
		5.2	The Definite Integral	Video, flash cards
		5.3	The Fundamental Theorem of Calculus	Video, flash cards
12	11/16	5.4	Indefinite Integrals and the Net Change Theorem	Video, flash cards
		5.5	The Substitution Rule	Video, flash cards
13	11/22	No class	Thanksgiving Recess	
14	11/30	6.1	Areas Between Curves	Video, flash cards
		6.2	Volumes	Video, flash cards
15	12/7		Review	
16	12/14		**Finals Week**	