Math 141- Calculus I (Spring 2019)

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Teaching Assistant: Stephen Smith; sjs8 (at) email (dot) sc (dot) edu
Course Website: Bookmark the course website `people.math.sc.edu/mlevet/S19/Math141`. You are responsible for checking the course website daily.

Office Hours:

- **Michael:** My regular office hours are MW from 10:30-11:30 and Tuesday from 1:00-2:00 in LeConte 400D. If my office hours are not convenient, I am happy to schedule an appointment. I encourage you to discuss the course material with me. Please note that office hours are a supplement for lecture, not a replacement for it. Students who miss class are solely responsible any material covered that day.

- **Stephen:** Stephen's office hours are TR from 2:30-3:30 in LeConte 122A.

- **Office Hours vs. Email:** I am generally happy to discuss course logistics via email (e.g., grades, excused absences, scheduling appointments, etc.). However, email is usually not a conducive medium for tutoring. If you email me with a question about the homework (and you are certainly welcome to do so), I reserve the right to ask you to come to office hours with your question. Note that this does associate some risk with procrastination, in that you may not get your question answered until after the assignment due date (or after the quiz/exam). Similarly, if you email me late at night, I may not see your email until the next day (after the assignment is due). Please plan accordingly.

Course: MW 2:20-3:35 (Lecture- Section 020 and 021), LC 412.

- **Section 020:** Tuesday 4:25-5:15 (LC 102); Thursday 4:25-5:15 (LC 303B).

- **Section 021:** Tuesday 6:00-6:50 (LC 102); Thursday 6:00-6:50 (LC 112).

Last Day to Drop Before Grade of 'W' Is Recorded: January 22, 2019
Last Day to Drop Before Grade of 'WF' Is Recorded: March 4, 2019
Breaks: MLK Day- January 21; Spring Break March 10-March 17.

Prerequisites: Grade of C or better in Math 112, 115, or 116; or qualification through the Math Placement Test. **Students are expected to have a working knowledge of high school algebra, trigenometry, and precalculus.**

Participation: All students are expected to show respect to every participant of the class, including other students, the instructor, and any guests visiting. Disruptive behavior of any kind will not be tolerated.

Calculators: You will neither need nor be permitted to use a calculator on quizzes or exams. Unless otherwise stated, all answers should be **exact**, rather than using decimal approximations (e.g., you should write 2/3 rather than 0.67).

Course Description: In this course, we will introduce calculus of a single variable at a technical level, discussing limits, continuity, derivatives, optimization, integration, and a number of big theorems. While a certain amount of the material is fairly rote and computational (e.g., computing derivatives), this course places heavy emphasis on a conceptual and theoretical mastery of the material. That is, we will precisely state mathematical definitions and theorems, as well as endeavor to thoroughly understand these statements. We will also apply these theorems to aid in solving various problems (that is, applying a theorem may only constitute a single step; further steps may be required to arrive at a solution or the desired conclusion), derive various formulas, and use our definitions to prove some basic results in calculus.

Math 141 has a number of responsibilities. The primary responsibility of this course is to Math 142 Calculus II and Math 241 Vector Calculus. The structure and pace of this course are designed to not only help students master the material, but also to prepare them for the rigor, pace, and expectations of Math 142. Much of the material in Math 141 is also examined in Math 241, only in greater generality. Therefore, we will also focus on developing a strong conceptual foundation of the material, so that students will be prepared to generalize the concepts in Math 241. Later courses that are of particular interest to engineers and computer scientists, such

as Differential Equations, Vector Analysis, Applied Complex Variables, and Discrete Structures also rely on the material from Math 141. Additionally, Math 141 is responsible for preparing students to apply calculus in their disciplines including pure math, computer science, chemistry, physics, engineering, the life sciences, economics, finance, and other fields of business. For these reasons, **I consider Math 141 the most important course you are taking this semester.**

Course Objectives: Formally, we have the following learning objectives:

- Students will demonstrate understanding of the following concepts: Limits and Continuity of Functions, The Derivative, Applications of the Derivative: Study of Graphs, Optimization, Mean Value Theorem, The Integral, The Fundamental Theorems of Calculus.

- Students will correctly compute derivatives and integrals.

- Students will correctly apply calculus techniques and theorems to construct models and solve problems.

- Students will connect quantites that are equal using equal signs. Quantities that are not equal will not be connected by equal signs. Students will not use arrows in lieu of equal signs. **There is a difference between an arrow and an equal sign; do not misuse.**

Text: George B. Thomas, Jr.: *Calculus Early Transcendentals*, USC edition, Pearson, 2014. ISBN 9781323157138. Note that, in terms of content, the USC edition is the 13th edition with Chapter 9 removed. You will also need an access code for `http://www.mymathlab.com`, the online homework software. To register for our class the Course ID is `levet46016`. Access to MyMathLab is required for this course. The cheapest way to purchase access is through `www.mypearsonstore.com` using the discount code `Gamecock` (both initial cap and no caps will work). Purchase the `ValuePack of student textbook + MML code, ISBN: 1323157131`. The discount code saves you 25% (bringing list price of $131.73 down to $98.80 and is good for all 3 semesters). Pearson offers free 5-7 day shipping.

Given that much of your homework will be through MyMathLab, I strongly suggest you not take my section of this course if you do not intend to purchase MyMathLab.

Course Structure:

- **Lecture:** Course lecture will be held on MW from 2:20-3:35. Lecture will be used to cover new material, including significant emphasis on **theoretical and conceptual** topics. We will also work examples to illustrate the theory. Quizzes may be given during certain lecture periods.

- **Recitation:** The main theme of recitation is solving problems in groups, especially homework and test questions. Explaining the material to others serves to reinforce the material for you. Conversely, it is beneficial to have multiple perspectives on the material. It is highly likely that you will benefit from the perspectives your classmates bring to the table. You should **DO** as many homework problems as you are able ahead of recitation, so that you can bring questions to discuss with your classmates and the course TA. Working in groups is **required**. Students who are not engaged in the material may be marked absent. Quizzes will frequently be given in recitation; these will be done individually.

- **Labs:** There will be a number of Maple labs, designed to provide practice with a computer algebra system and engage with basic techniques in numerical analysis. Students will apply the techniques they learn in class and use Maple to better visualize teh concepts. Lab assignments will count towards your homework grade.

Homework: Your learning in this class will ultimately come from making a good faith attempt to answer the homework questions. There will be three types of homework assignments for this course. Your homework average counts for 15% of your final grade.

- **MyMathLab:** There will be a number of assignments to be completed online via MyMathLab. The MyMathLab assignments will primarily, though not exclusively, focus on computational questions. Your MyMathLab submissions will be graded for correctness. Given that MyMathLab is online, you will **only** be granted extensions in extenuating circumstances (e.g., hospitalization, death of a family member).

- **Written Homework:** I will occasionally assign written homework, which will be collected at the end of class on the assigned date unless indicated otherwise. Written assignments are designed for students to engage with more conceptual questions, and for me to provide feedback on your work. You should write up your problems formally and correctly, clearly documenting your work. This includes explaining your work in **complete sentences**, where appropriate. **All written homework must be turned in via hard copy, stapled in the top-left corner. You must use proper mathematical notation.** Any deviation from this may result in your homework receiving a grade of 0 and returned to you, ungraded. Late homework will not be accepted (unless it is the result of an officially excused absence, with documentation. If at all possible, you must discuss this with me ahead of time.).

- **Suggested Problems:** I will occasionally suggest problems, usually from the textbook. These problems will **not** be collected, nor will they be graded. However, they serve as a good source of practice for you and an additional source of questions for the quizzes/exams.

Quizzes: I will also give regular quizzes, some of which may be unannounced. The quizzes will be closely connected to the homework problems, emphasizing the more challenging material. Students who master the homework problems should succeed on the quizzes. Note that the quizzes are closed book, closed note, and electronic devices of any sort are strictly prohibited. All quizzes are to be done individually. **NO MAKEUP QUIZZES WILL BE GIVEN.** In accordance with USC's attendance policy, the lowest 10% of your quiz scores will be dropped. Your quiz average counts for 15% of your final grade.

Exams: There will be three midterm exams and a final. The midterms will be fairly traditional in that they will be closed book, closed note, and in class. All exams are to be done individually. Electronic devices of any sort are prohibited during any assessment (quiz or exam). Each midterm exam counts for 15% of your final grade.

Final Exam: The final exam period is scheduled for **Friday May 3 at 12:30 PM in LC 412**. Note that the final exam period is mandatory and cannot be made up for discretionary reasons, including (but not limited to) a conflicting final exam at another institution or being out of town. The final exam counts for 25% of your final grade.

Grading:
Homework- 15%
Quizzes- 15%
Three Midterm Exams- 15% Each
Final Exam- 25%

Cutoffs of 90, 85, 80, 75, 70, 65, and 60 will guarantee an A, B+, B, C+, C, D+, and D respectively. Actual thresholds may be lower. I will keep you apprised of a tentative curve after each exam. Note that each tentative curve will be based on class performance as a whole, and not a prior tentative curve. Final grades should be interpreted in the following manner. An **A** indicates **strong preparedness** for Math 142. A grade of **B** indicates **reasonable preparedness** for Math 142. A grade of **C** indicates **minimal preparedness** for Math 142, which is a dangerous problem. In borderline cases, student growth and preparedness for Math 142 will be the primary factors used to determine whether a student will receive the higher grade.

Grade Disputes: Any grade dispute must be raised within one week of an assignment being returned to the class. The only grade disputes that will be honored are those where a mistake was made in grading. In particular, all points earned (or lost) are final, unless due to a mistake made by the grader. In order for a grade dispute to be considered, you must submit your graded assignment, along with a written request indicating the problem(s) in question, a clear explanation defending the correctness of your answer(s), and an indication of where the instructor made a mistake in grading. **Any grade dispute regarding a Maple assignment should be directed to the TA. All other disputes should be directed to the instructor. In both cases, you must follow this procedure.** The instructor/TA will then consider the grade dispute and make a decision regarding how many (if any) points to award. The instructor's/TA's decision regarding any grade dispute is final.

Note that I always welcome questions regarding the material, and I encourge you to discuss problems you missed with me.

Electronics and Cell Phone Policy: Electronic devices and cell phones should be silent, and not make any noise during class. Social media, YouTube, and games are distracting to students in class. If you wish to use your laptop for purposes other than note-taking, I ask that you sit in the back of the classroom so as not to distract others. If you are expecting an emergency phone call, please sit towards the front of the classroom and discreetly step out when you need to take the call.

During quizzes and exams, all electronic devices are prohibited. Such devices include, but are not limited to, cell phones, smart watches, and calculators are required to be **in your backpack, and not on your person (including, but not limited to your pocket).** Any student found to possess prohibited electronic devices on their persons during a quiz or exam will receive a 0 on that assignment, as a violation of the syllabus policy. Any student suspected of using such devices to cheat will also be referred to the Office of Academic Integrity; those found responsible will be subjected to the penalties described under the Honor Code section of the syllabus.

Honor Code: You are expected to know the Academic Code of Responsibility as it appears in the *Carolina Community: Student Policy Manual.* Much of what you will learn about mathematics will come from your discussions with your peers. You are welcome and encouraged to discuss the homework problems with each other and with me. It is expected that you work the problems by yourself first, so that you can contribute to the discussion. This policy will be changed, reluctantly, if I find it is being abused. **Your submissions must be written in your own words and reflect your understanding of the material.** If there are any questions regarding this policy, please ask me.

Any honor code violation will result in the following minimum penalties:
(1) You will receive a -200% on the assignment.
(2) You will be reported to the Office of Academic Integrity, which may choose to impose additional penalties.
(3) You will be disqualified from any curve at the end of the semester.

The usual penalty for honor code violations is receiving an F for the course. Multiple instances of cheating will certainly result in an F for the course. **Please do not cheat.** It is not worth it.

Students with Disabilities: If you have a disability, please register with Student Disability Services (LeConte 112A). You must be registered with Student Disability Services to receive accommodations. **You must talk to me before using accommodations.**

Absences: Students are expected to attend class (lecture, lab, and recitation) every day. If a student misses class, he or she is solely responsible for the material that was covered. Attendance will be taken every day that an assignment (quiz, exam, or written homework) is collected or returned. Students who are not present to take the quiz or pick up their graded assignment will be marked absent. In accordance with USC's attendance policy, absence from more than 10% of class meetings **(whether excused or unexcused)** is considered excessive, and the instructor may choose to impose a grade penalty. Note that 10% of the class meetings corresponds to **6 Days**, and students missing more than **6 Days** of class **whether excused or unexcused** will have their final grade lowered by half a letter grade.

Students will not be allowed to make up an exam, except in extenuating circumstances (death of a family member, hospitalization, etc.). There will be **NO MAKEUPS** for quizzes. **Please note:** In order for an absence to be considered excused, it is necessary that the student notifies the instructor at least 48 hours in advance or as soon as he or she is able, whichever comes first. **Please communicate via email rather than waiting until you return.** The instructor reserves the right to require documentation. Note that non-emergency events (weddings, non-scholarship sports, vacations, etc.) will not be excused. **As a general rule, if you want your absence to be considered excused, you need to provide documentation and upfront, if at all possible.** Additionally, a swath of unexcused absences early in the semester does not warrant leniency later in the semester; budget your absences accordingly.

Note that these absences are intended for unforseen circumstances such as illness, short-term personal emergencies, or absences due to legitimate universitiy reasons (e.g., a Marine Science field trip). Exceptions to this policy will only be made for **extended and prolonged emergencies** such as extended hospitalizations or

serious illness/death of a family member, in which cases the instructor reserves the right to require documentation. The final decision as to what constitutes an extended or prolonged emergency rests with the instructor.

Support: The following are good resources for seeking help:

- My office hours.

- SI Sessions.

- Free Tutoring in LC 105- MTWR from 10:00 AM-4:00 PM.

Hints for Success:

- Attend SI. Our SI program has had tremendous impact on improving student mastery of the material, as well as student grades.

- This is a 4 credit hour course. Therefore, well-prepared should be spending 16 hours **outside of class** working on the material. Three of these hours should be spent in SI. Underprepared students may need to put in additional time to succeed.

- After completing a homework problem, ask yourself three questions: (1) What tools from class did I need to complete this problem, and how did I use them? (2) How could this problem show up on an exam? (3) What common mistakes might I make with this problem on an exam? Do this with **every** homework problem.

- Ask for help. The instructor is here to help you succeed, and there are many additional resources for you to seek help (see under Support).

- **Do math.** Note that I said **do math**, NOT look at solutions or watch YouTube videos. The only way you will learn math is to work problems. This is not a spectator sport.

- Please see Bud Brown's hints for success.

Tentative Schedule: Please note that the course content is set by the department, and not the instructor. Dates with a ∗ indicate that the material will be introduced in recitation instead of lecture.

Class #	Date	Section	Topic
1	Jan. 14	1.1-1.3	Functions, Composition, and Trig Functions
2	Jan. 16	1.5-1.6	Exponential and Inverse Functions
3	Jan. 23	2.1-2.2	Rates of Change and Tangents, Limits
4	Jan. 28	2.3	Formalizing Limits: The $\delta - \epsilon$ definition.
5	Jan. 30	2.4-2.6	One-Sided Limits, Continuity, Limits at Infinity
6	Feb. 4	3.1-3.2	Derivative at a Point and as a Function
7	Feb. 6	3.3	Derivative Rules
8	Feb. 7*		Review for Exam 1
9	Feb. 11		Exam 1
10	Feb. 13	3.5-3.6	Derivatives of Trig Functions, Chain Rule
11	Feb. 18	3.7-3.8	Implicit Differentiation, Derivatives of Logarithms
12	Feb. 20	3.9	Derivatives of Inverse (Trig) Functions
13	Feb. 25	3.10	Related Rates
14	Feb. 27	4.1, 4.2	Extreme Values, Mean Value Theorem
15	March 4	4.3	First Derivative Test
16	March 5*		Review for Exam 2
17	March 6		Exam 2
18	March 7*	4.4	Concavity and Curve Sketching
19	March 18	4.5	L'Hopital's Rule and Indeterminate Forms
20	March 20	4.6	Optimization
21	March 25	4.8, 5.1	Antiderivatives, Estimating Area
22	April 1	5.2-5.3	Riemann Sums, The Definite Integral
23	April 3	5.4	Fundamental Theorem of Calculus, Indefinite Integrals
24	April 8	5.5	Integration by Substitution
25	April 10	5.6	Area Between Curves
26	April 15	6.2	Disk and Washer Method
27	April 17		Review for Exam 3
28	April 22		Exam 3
29	April 24		Review for Final Exam
30	April 29		Review for Final Exam

Note: The instructor reserves the right to modify the syllabus as needed; particularly, as dictated by the interests of learning and fairness.