Math 122- Calculus for BA and Social Sciences
Fall 2018

Instructor: Michael Levet; mlevet (at) email (dot) sc (dot) edu
Course Website: Bookmark `people.math.sc.edu/mlevet/F18/Math122_MWF/`. Announcements and written homework will be posted here. You are responsible for checking the course website daily.

Office Hours: My regular office hours are MW from 2:30-3:30 and TR from 3:00-4:00 in LC 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.

- **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. Students learn the material better by discussing it in person rather than via email. 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). Please plan accordingly.

Course: MWF 12:00-12:50, Humanities 202. Aug. 23-Dec. 7, 2018.
Last Day to Drop Before Grade of 'W' Is Recorded: Wednesday August 29, 2018
Last Day to Drop Before Grade of 'WF' Is Recorded: Monday October 15, 2018
Breaks: Sept. 3; Fall Break- October 18-19; Thanksgiving Break- Nov. 21-25

Prerequisites: Qualification through Math Placement Test; or grade of C or better in Math 111/111I or Math 115.

Participation: All students are expected to show respect to every participant of the class, including other students, the instructor, and any guests visiting. This includes not talking over the instructor or your classmates.

Late Adds: Students who add the class after the first day are responsible for all material covered prior to their official enrollment, regardless of whether they were present in class. Additionally, students who add the class late are expected to take any quiz or exam on that day, even if it is their first day in the course.

Calculators: Officially, a graphing calculator is required for this course. The TI-83 or TI-84 is highly recommended, and such calculators will be permitted on quizzes and tests. Any graphing calculator with a computer algebra system (CAS) such as the TI-89, TI-Nspire CAS, or similar will not be allowed on quizzes or exams. Note that the instructor will not have spare calculators on quiz/test days, and sharing calculators during quizzes and exams is strictly prohibited. **You will be required to clear the memory on your calculator before each quiz or exam. The insturctor reserves the right to verify that you have done so. Failure to clear the memory on your calculator constitutes an honor code violation.**

Course Description: The fundamental idea of calculus is easy to state: add up the rates to obtain the change. This fundamental idea provides significant depth and application. After a brief review of precalculus, we will proceed to formalize the notion of rate of change, with the derivative. Differential calculus, the study of the derivative, provides numerous applications to almost every technical discipline, including optimization, probability and statistics, the hard sciences (chemistry, physics, and the life sciences), many fields of business, and computer science. Therefore, a strong foundation in differential calculus will pay dividends for the rest of your academic career. We will conclude the course with the study of integral calculus, which focuses on the accumulated effect of infinitesimal changes over a period of time.

A significant portion of the course will be devoted to discussing how to compute derivatives and integrals, as well as their applications. We will also discuss the underlying mathematical ideas to promote a deeper understanding of calculus. A third key goal of this course is to develop your critical thinking and problem solving skills, as well as your ability to communicate your thought process in a precise manner. This third goal is especially relevant to everyone, regardless of degree track or goals.

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

- Students will gain proficiency working with various algebraic functions, including polynomials, exponentials, logarithms, rational functions, and derivatives and integrals of such functions.
- Students will apply the techniques from class to solve problems related to intercepts, rates of change, optimization, and accumulation problems. Beyond correctly modeling a problem, students will also correctly ascribe meaning to the various components of the model and the solution. Note that some of these problems will require multiple steps.
- Students will correctly solve the problems in the course with meaningful, correct, and complete work. 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: The course textbook is available as part of your WileyPlus subscrption. The cheapest option is to purchase a WileyPlus access code for $79 via the WileyPlus website directly. Note that WileyPlus has a free 14-day grace period. **I expect everyone to have access to WileyPlus and the textbook by August 30.** The WileyPlus course URL is: `www.wileyplus.com/class/649507`. **Given that most of your homework will be through WileyPlus, I strongly suggest you not take my section of this course if you do not intend to purchase WileyPlus.**

Homework: Your learning in this class will ultimately come from making a good faith attempt to answer the homework questions. The homework problems will provide opportunities for you to apply the techniques and approaches from lecture. Note that the homework problems will sometimes require you to apply concepts in new ways or piece together multiple concepts. **Keep in mind that the point of lecture is to introduce the concepts and techniques, rather than exhaustive procedures for every possible problem. Start early enough on the homework, so that you can come to office hours with any questions.** There will be three types of homework assignments for this course. Your homework average counts for 15% of your final grade.

- **WileyPlus:** Almost all of your assignments will be completed online via WileyPlus. You will be provided with multiple attempts and problem solving resources. Your WileyPlus submissions will be graded for correctness. Given that WileyPlus 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. You should write up your problems formally and correctly, clearly documenting your work. This includes explaining your work in **complete sentences**. **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).
- **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. I **strongly recommend** working through the suggested problems. Even if I do not suggest problems from the book, this is the first place you should look for extra practice.

Quizzes: I will also give regular quizzes, some of which may be unannounced. The quizzes will be closely connected to the homework problems, **emphasizing frequently missed and challenging problems on the homework.** Therefore, it is advisable to review the homework problems, reworking the ones you missed, and seek help as necessary prior to the quizzes. 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 (except for approved calculators) 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 (given on Sept. 24, Oct. 11, and Nov. 19) 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 (except for approved calculators) are prohibited during any assessment (quiz or exam). **You will be required to clear the memory on your calculator before each quiz or exam. The insturctor reserves the right to verify that you have done so. Failure to clear the memory on your calculator constitutes an honor code violation.**

Also, note that **exams will not be rescheduled except in extreme circumstances (death of a family member, hospitalization at the time of the exam, religious observation etc.). The instructor reserves the right to require documentation. If at all possible, you must notify me as soon as you become aware of an extenuating circumstance or 48 hours in advance, whichever comes first.** Note that non-emergency events (weddings, non-scholarship sports, vacations, oversleeping, travel plans, etc.) will not be excused. Each midterm exam counts for 15% of your final grade.

Final Exam: The final exam period is scheduled for **Wednesday, Dec. 12 at 12:30 PM in Humanities 202**. 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 correspond to an A, B+, B, C+, C, D+, and D respectively. Students earning lower than a 60 will receive an F. There will not be a curve.

Grade Disputes: Any grade dispute must be brought to my attention within one week of an assignment being returned. The only grade disputes that will be honored are those where the instructor made a mistake in grading. In particular, all points earned (or lost) are final, unless due to a mistake made by the instructor. 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. The instructor will then consider the grade dispute and make a decision regarding how many (if any) points to award. The instructor'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.

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.

The usual penalty for those found responsible of honor code violations is receiving an F for the course. All honor code violations will be reported to the office of academic integrity. Students found responsible of honor code violations will be subject to a minimal penalty of -200% on the assignment. Responsibility for multiple honor code violations will be sufficient (though not necessary) grounds for a recommendation that an F for the course be issued. Finally, as noted in the Student Policy Manual, the maximum penalty for cheating on an assignment is expulsion from the University. These penalties apply both to copier and copiee. **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.

Absences: Students are expected to attend class every day. If a student misses class, they are responsible for the material that was covered. I will take attendance every day that I return an assignment or give a quiz.

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. Therefore, 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 (as described under Exams). 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. 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.

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 near the door and discreetely step out when you need to take the call.

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.
- Free Peer Tutoring via the Student Success Center.

Hints for Success:

- Attend SI. Our SI program has had tremendous impact on improving student mastery of the material, as well as student grades. You may attend any Math 122 SI Leader's sessions, not just those of our own SI Leader.
- This is a 3 credit hour course. Therefore, well-prepared should be spending 9-12 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. **Note:** I assign homework and quizzes with a 9-12 hour commitment in mind.
- When working homework problems, make several passes at them. A first pass at problems should be in an open-book environment by yourself, with the goal of working through the problems and learning the material. After working through the material on your own, then work with your peers and seek help in office hours. Your third (and subsequent) pass(es) should be in a closed book environment, with the goal of working through problems correctly and efficiently. Essentially, you want to simulate a quiz/test environment. **For this reason, math is not suitable to starting the night before.**
- After graded quizzes and tests are returned, go through them immediately (and seek help) to fix any weak areas. In this way, you are studying for exams as you go. So as the exam approaches, studying should be a matter of maintenance instead of re-teaching yourself an entire unit short-term.
- 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. Time has also been scheduled to account for natural disasters (such as our annual flood) and topics where an extra day may be useful. **The schedule and contents of the exams are subject to change. The exam dates are fixed.**

Class #	Date	Section	Topic
1	Aug. 24	1.1	Functions
2	Aug. 27	1.2	Linear Functions
3	Aug. 29	1.3	Rates of Change
4	Aug. 31	1.4	Applications of Functions to Economics
5	Sept. 5	1.5	Exponential Functions
6	Sept. 7	1.6	The Natural Logarithm
7	Sept. 10	1.7	Exponential Growth and Decay
8	Sept. 12	1.8	Function Transformations
9	Sept. 14	1.9	Power Functions and Proportionality
10	Sept. 17	3.1/3.2	Derivative Rules (Power Rule, Exponentials, Logs)
11	Sept. 19	3.3	Chain Rule
12	Sept. 21	1.1-3.2	Review for Exam 1
13	Sept. 24	1.1-3.2	Exam 1
14	Sept. 26	3.4	Product and Quotient Rules
15	Sept. 28	2.1/2.2	Instantaneous Rate of Change
16	Oct. 1	2.2/2.3	Interpretations of the Derivative
17	Oct. 3	2.4	The Second Derivative
18	Oct. 5	2.5	Marginal Cost and Revenue
19	Oct. 8	4.1	Local Maxima and Minima
20	Oct. 10	4.2	Inflection Points
21	Oct. 12	2.1-2.5, 3.3-3.4, 4.1-4.2	Review for Exam 2
22	Oct. 15	2.1-2.5, 3.3-3.4, 4.1-4.2	Exam 2 **(Drop Deadline: October 15)**
23	Oct. 17	4.3	Global Maxima and Minima
24	Oct. 22	4.4	Profit, Cost, and Revenue
25	Oct. 24	5.1	Distance and Accumulated Cange
26	Oct. 26	5.2/5.3	The Definite Integral and Area
27	Oct. 29	5.4	Interpretations of the Definite Integral
28	Oct. 31	5.5	Fundamental Theorem of Calculus
29	Nov. 2	6.1	Antiderivatives
30	Nov. 5	6.2	Antiderivatives and Indefinite Integral
31	Nov. 7	6.3	Using FTC to Compute Integrals
32	Nov. 9	6.6	Integration by Substitution
33	Nov. 12	6.6	Integration by Substitution
34	Nov. 14	5.6	Average Value
35	Nov. 16	4.3-4.4, 5.1-5.5, 6.1-6.3, 6.6	Review for Exam 3
36	Nov. 19	4.3-4.4, 5.1-5.5, 6.1-6.3, 6.6	Exam 3 **(Monday before Thanksgiving)**
37	Nov. 26	6.4	Consumer and Producer Surplus
38	Nov. 28		Review/Makeup
39	Nov. 30		Review/Makeup
40	Dec. 3		Review/Makeup
41	Dec. 5		Review for Final Exam
42	Dec. 7		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.