

Math 170- Finite Mathematics

Spring 2019

Instructor: Michael Levet; mlevet (at) email (dot) sc (dot) edu

Course Website: Bookmark the course website <http://people.math.sc.edu/mlevet/S19/Math170/>. 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 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.

- **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: MW 3:55-5:10 PM LeConte 412;

Last Day to Drop Before Grade of 'W' Is Recorded: Tuesday January 22, 2019

Last Day to Drop Before Grade of 'WF' Is Recorded: Monday March 4, 2019

Breaks: MLK Day- January 21; Spring Break- March 10-17.

Prerequisites: Qualification through the 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: You will need a graphing calculator that can handle matrix calculations. The approved graphing calculators for Math 122 (e.g., the TI-83 or TI-84) work well and are highly recommended. Your phone is not an acceptable calculator. 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 instructor 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: Math 170 surveys a number of topics in discrete mathematics such as matrix algebra, solving systems of equations, linear programming, combinatorics, and discrete probability. Much of this material is useful in business, the life sciences, and your Probability and Statistics courses. Beyond the material, Math 170 emphasizes creative problem solving, more so than previous courses such as Math 111/115 and Math 122.

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

- Students will apply the methods and techniques from class to critically evaluate data and solve 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 and effectively communicate their reasoning, both verbally and in writing.

- Students will correctly solve the problems in the course with meaningful, correct, and complete work. Students will connect quantities 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 WebAssign subscription. The cheapest option is to purchase a WebAssign access code for \$90 via the WebAssign website directly. Note that WebAssign has a free 14-day grace period. Delays in obtaining access to WebAssign do not warrant extensions on the homework. The WebAssign course code: sc 9097 6975. **Given that most of your homework will be through WebAssign, I strongly suggest you not take my section of this course if you do not intend to purchase WebAssign.**

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 12.5% of your final grade.

- **WebAssign:** Almost all of your assignments will be completed online via WebAssign. You will be provided with multiple attempts and problem solving resources. Your WebAssign submissions will be graded for correctness. Given that WebAssign is online, you will **only** be granted extensions in extenuating circumstances (e.g., hospitalization, death of a family member).
- **Study Guides:** I will post study guide problems for the majority of the sections. The study guide problems are intended to provide some indication as to the difficulty of quiz/exam problems, as well as how I might phrase quiz/exam problems. Answers and solutions to **selected** study guide problems will be provided, to help you check your understanding of the concepts. I will **NOT** provide solutions keys to entire study guides. It is important that you work through problems on your own, rather than memorizing answers on solutions keys. I encourage you to **ask** about problems that you don't understand in advance.
- **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.

Quizzes: I will also give regular quizzes, some of which may be unannounced. The quizzes will be closely connected to the homework and study guide 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 12.5% of your final grade.

Exams: There will be three midterm exams (Feb. 13, March 6, and April 17) and a final. The exams 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 instructor 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.

Grading:

Homework- 12.5%

Quizzes- 12.5%

Exams- 75% (three midterms and one final exam). The breakdown is as follows.

- Test 1 (Your Best Exam Score): 30% of your final grade.
- Test 2 (Your Second Best Exam Score): 25% of your final grade.
- Test 3 (Your Third Best Exam Score): 20% of your final grade.
- Test 4 (Your Worst Exam Score): 0% of your final grade; this exam is **dropped**.

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.

Final Exam: The final exam period is scheduled for **Monday May 6 at 4:00 PM in the usual classroom**. Note that the final exam period cannot be made up for discretionary reasons, including (but not limited to) a conflicting final exam at another institution or being out of town. As the lowest exam score is dropped, students who are happy with their grades as of reading day need not take the final exam. Students intending to take the final exam must let me know **in writing, via email** by reading day (April 30). The final exam will be **cumulative**.

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 encourage 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 near the door and discreetly step out when you need to take the call. **Students found to possess an electronic device other than an approved calculator on their person during a quiz or exam will automatically receive a 0 on the assignment. If the student is suspected of an honor code violation, they will also be referred to the Office of Academic Integrity and subjected to the penalties described under the Honor Code section.**

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 copiece.

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 and stay for the duration of class. Students leaving early or not participating during classwork (e.g., excessively on their phones) will be marked absent. 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 **4 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 unforeseen circumstances such as illness, short-term personal emergencies, or absences due to legitimate university 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.
- Free Tutoring in LC 105- MTWR from 10:00 AM-4:00 PM.
- Free Peer Tutoring via the Student Success Center.

Hints for Success:

- This is a 3 credit hour course. Therefore, well-prepared should be spending 9-12 hours **outside of class** working on the material. 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	Jan. 14	6.1-6.2	Sets and Set Operations, Cardinality
2	Jan. 16	6.3	Addition and Multiplication Principles, Words
3	Jan. 23	6.4	Permutations
4	Jan. 28	6.4	Combinations
5	Jan. 30	7.1	Sample Spaces, Events
6	Feb. 4	7.2	Relative Frequency
7	Feb. 6	7.3	Probability and Models
8	Feb. 11		Review for Exam 1
9	Feb. 13		Exam 1
10	Feb. 18	7.4	Probability and Counting Techniques
11	Feb. 20	7.5	Conditional Probability and Independence
12	Feb. 25	7.6	Bayes' Theorem and Applications
13	Feb. 27	7.6	Bayes' Theorem and Applications
14	Mar. 4		Review for Exam 2
15	Mar. 6		Exam 2 (Day Before Spring Break)
16	Mar. 18	3.1-3.2	Systems of Two Equations and Matrices
17	Mar. 20	3.3	Applications of Systems of Equations
18	Mar. 25	4.1-4.3	Matrix Algebra
19	Mar. 27	5.1	Systems of Linear Inequalities
20	Mar. 29	5.2	Linear Programming
21	Apr. 1	5.2	Linear Programming
22	Apr. 3	7.7	Markov Systems
23	Apr. 8	8.1	Random Variables and Distributions
24	Apr. 10	8.2	Binomial Random Variables
25	Apr. 15		Review for Exam 3
26	Apr. 17		Exam 3
27	Apr. 22		Review for Final Exam
28	Apr. 24		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.