

University of Kentucky - Department of Statistics
Math Review for Statistics Graduate Students
August 5 - August 14

Instructor: Dr. Nathan Druivenga

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Office: MDS (only for duration of course)

Office Hours: MDS 315 11:30 - 1:15pm

Class Time and Location: Class will meet in Multi Disciplinary Science Building (MDS) 335 according to the following schedule.

Date	Morning Session	Afternoon Session
8/5	No Class	1:30-2:45
8/6 - 8/13	10-11:15 AM	1:30-2:45 PM
8/14	10-11:15 AM	No Class

Course Material: You can use any calculus and linear algebra reference for this course. I will be loosely using the following textbooks.

1. Calculus by *Anton* (6th edition)
2. Elementary Linear Algebra by *Anton-Rorres* (8th edition)

Course Website: The web page for this class is <http://www.ms.uky.edu/~nadr222/StatsBootCamp2019.html>. A tentative agenda and handouts will be posted there.

Overview of Course: You are beginning a career of graduate study in statistics. As you progress through your course work, your professors will assume that you possess a certain amount of mathematical background. The goal of this course is to provide a focused review to strengthen this mathematical background in the areas of calculus and linear algebra as well as to strengthen your mathematical communication skills. We will discuss limits, continuity, differentiation, integration, sequences, series, vector spaces, matrices, linear transformations, determinants, eigenvalues, eigenvectors, diagonalization, and orthogonal projections. Time permitting, we will discuss uniform continuity, Taylor series, spectral decomposition, and positive definite matrices.

Grading and Assessment: I will consider your overall performance on the homework assignments and participation in class discussions and compose a written evaluation that will reflect your level of mathematical preparedness. This evaluation will be reported to the Director of Graduate Studies for the Statistics Department, but the evaluation will NOT appear on your official UK transcript.

Homework: Homework will be assigned at the end of each class session. Unless otherwise stated, each assignment is due at the start of the following class period. These assignments are meant to improve your problem-solving skills. Searching for solutions online or in a solutions manual as well as copying from someone else is academic dishonesty and completely undermines this purpose. If I believe that you have copied a solution from an unapproved source, I will notify your Director of Graduate Studies. I am firm supporter of students working collaboratively, but there are many times when a student has to stand on his or her own merit. Therefore, you are welcome to work with each other to learn a concept or understand the idea behind a problem, but you should write up your solutions independently and in your own words. An over-reliance on your notes or other students will cause problems later in your graduate career.

Participation and Attendance: This course constitutes fifteen 75-minute class sessions, and full attendance is expected. Frequent absence indicates a lack of commitment to your graduate study and will be reported to your DGS. Not only should you attend each class session, but you should be willing and prepared to participate and engage with the material each day. While I don't have a strict technology policy, I find it very rude and unprofessional to be regularly messing with your phone or tablet. If you are unable to give proper respect to yourself, your classmates, or your instructor, then you may be asked to leave the class.

Biographical Assignment: This class will be more beneficial if I know a little bit about you. Before the start of the morning session on August 6, please send me an e-mail with a short biography about yourself. Use the e-mail address that you will be checking over the next week and a half in case that I want to e-mail you. Be sure to include the following:

- your name (and what you like to be called if not your given name)
- your mathematical background (what kinds of math classes have you taken? how long ago?)
- what previous undergraduate and graduate institutions did you attend?
- if you took time off from your studies, what did you do?
- what drew you to graduate school in statistics?
- something interesting and/or unique about yourself.

After you have written your short biography, write a short paragraph regarding what you hope to accomplish in this review course. Are there any particular topics you wish to address? I would like to know where to focus our time, so this is your chance to provide your input. We will be covering selected topics in calculus (e.g. limits, differentiation, integration, sequences, series, Taylor series), linear algebra (e.g. column and null spaces, linear maps, eigenvalues/eigenvectors, diagonalization, orthogonal projections), and basic proofs.