



MSBA Statistics Boot Camp Course syllabus

Summer 2021
Short Session II

INSTRUCTOR

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Office hours

By appointment

OVERVIEW

Success in the MSBA program depends fundamentally on your grasp of basic statistical concepts. For some that grasp is currently pretty fragile; for others it is more secure. The aim of this boot camp is to improve every student's level of mastery and set the stage for your fall semester course work.

First, we probably should say what these concepts are. In broadest terms, they are the ideas underlying *probability* and *mathematical statistics*. You had exposure to most of them in your introductory statistics course, but that was probably a while ago and what you will need for the MSBA program is a little more sophisticated. Don't worry though – the boot camp tutorials will give you plenty of opportunity for repetition, so you can build your understanding incrementally.

While the tutorials have a computational component, they are not primarily about computation, visualization or learning new R tricks. The emphasis here is on analytical concepts. Computation and code enter the discussion largely in the course of illustration. You will do well to follow along with a notebook and pen.

COURSE OBJECTIVES

After completing this course, you should understand these 10 things:

1. what a random variable is and what random sampling means
2. the classical approach to probability
3. probability distributions and their “features”
4. laws of iterated expectations and total variance
5. the normal and related distributions
6. the law of large numbers and central limit theorem
7. estimator properties
8. asymptotically valid approaches to inference
9. the difference between economic and statistical significance
10. how to map these statistical concepts to simple linear regression.



RECOMMENDED READINGS

- Aronow, P. and B. Miller, *Foundations of Agnostic Statistics*, Cambridge University Press.
- Wooldridge, J., *Introduction to Econometrics: A Modern Approach, 7e*, Cengage.
- Cunningham S., *Causal Inference: The Mixtape*, Yale University Press.
- Angrist, J. and Pischke, S., *Mastering 'Metrics*, Princeton University Press.

Aronow and Miller provides a solid foundation for the topics covered in the boot camp, but you will probably find their treatment a bit more sophisticated than your undergraduate statistics text. Where their discussion seems unfamiliar, you will need to “level up” for the road ahead. Wooldridge, which is my favorite undergraduate econometrics text, has a nice concise treatment of the basic concepts. The boot camp tutorials owe much to each.

Along with Wooldridge, Cunningham and Angrist & Pischke are key texts for the causal inference course (ECON 7710) that follows the boot camp, and both deal directly with the most essential stat concepts. (Note there is a free [bookdown version](#) of *The Mixtape*.)

BOOT CAMP TOPICAL OUTLINE

1. Probability
 - a. Random variables
 - b. Probability distributions
 - c. “Features” of distributions
 - d. Conditional expectation
 - e. Normal and related distributions
2. Mathematical Statistics
 - a. Estimation
 - i. Random sampling
 - ii. Sampling distributions
 - iii. Unbiasedness and efficiency
 - iv. Consistency and asymptotic normality
 - b. Inference
 - i. Confidence intervals
 - ii. Hypothesis testing
 - iii. Asymptotically valid test statistics
 - iv. p -values and economic vs statistical significance
3. Simple linear regression



ACCOUNTABILITY AND CONTENT MASTERY

You will be guided through the boot camp material through a series of tutorials that follow the topical outline. You should approach each tutorial with notetaking in mind. Each tutorial includes a few quizzes to keep you focused. There are also a few places to play with some code that demonstrates a concept.

These tutorials are designed to be completed over the next four weeks. At the end – during the final exam period for the “Short II” summer session – I will release a test of the boot camp material to gauge your progress. Faithfully completing the tutorials should ensure success on the test.

Mastering the boot camp material will be essential to success in the fall. To nudge accountability, test scores above 80 will add 2 points to your overall course average in ECON 7710 (which may be enough to push you into a higher grade category).

UNIVERSITY HONOR CODE & ACADEMIC HONESTY POLICY

As a University of Georgia student, you have agreed to abide by the University’s academic honesty policy, “A Culture of Honesty,” and the Student Honor Code. All academic work must meet the standards described in “A Culture of Honesty” found at:

<https://ovpi.uga.edu/academic-honesty>. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

MENTAL HEALTH AND WELLNESS RESOURCES

If you or someone you know needs assistance, you are encouraged to contact Student Care and Outreach in the Division of Student Affairs at 706-542-7774 or visit <https://sco.uga.edu>. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.

UGA has several resources for a student seeking mental health services (<https://www.uhs.uga.edu/bewelluga/bewelluga>) or crisis support (<https://www.uhs.uga.edu/info/emergencies>).

If you need help managing stress anxiety, relationships, etc., please visit BeWellUGA (<https://www.uhs.uga.edu/bewelluga/bewelluga>) for a list of FREE workshops, classes, mentoring, and health coaching led by licensed clinicians and health educators in the University Health Center.

Additional resources can be accessed through the UGA App.



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CHANGES TO THE SYLLABUS

The syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.