INTRODUCTION TO PROBABILITY AND STATISTICS

Preparatory Summer Course for Econometrics Sequence

COURSE DESCRIPTION

This course provides an introduction to basic concepts in mathematical statistics and lays a foundation for a rigorous discussion of econometric methods. Topics include: probability measure, random variables, density and distribution functions, expectations, moment generating functions, conditional distributions, independence, distribution of functions of random variables, parameter estimators, hypothesis testing, sufficient statistics, and (if time permits) asymptotic distribution theory. This course is offered in the summer and is intended to help students fulfill the probability and statistics prerequisite.

ASSUMED REQUIREMENTS

Students are assumed to have a good mathematical background especially in differential and integral calculus.

ADVICE

If you are not familiar with the topics covered by the course at the level of the textbooks listed below it is strongly recommended that you prepare yourself for the course by reading the textbooks in advance, working through sample problem sets and sample exams, etc., available on: http://econweb.umd.edu/~prucha/Probability_Statistics.html

In terms of hours of lectures, the summer course is comparable to a regular one-semester course. However, given the compressed nature of 1 ½ weeks of instruction, it will be very difficult for you to absorb the material if it is very much new to you. It is hoped that the course will strengthen your knowledge to a level that is needed for a successful
completion of the econometrics sequence. For further details regarding the Probability and Statistics prerequisite see my teaching website or contact the Department.

**PRINCIPAL TEXTS**


**SUPPLEMENTARY TEXT**


**HANDOUT**

- Introduction to Probability and Statistics

**EXAM BEFORE SUMMER COURSE:** Time and location of the pretest is to be determined. Please contact the TA if you would like to take the pretest.

**EXAM AFTER SUMMER COURSE:** Saturday, August 12, 10:00am-12:00pm EST, in person.

**ACADEMIC INTEGRITY**

The student-administered University Honor Code and Honor Pledge (https://president.umd.edu/administration/policies/section-iii-academic-affairs/iii-100a) prohibits students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, and forging signatures. On every examination, students must write by hand and sign the following pledge:

“I pledge on my honor that I have not given or received any unauthorized assistance on this examination or assignment.”

Compliance with the code is administered by the Student Honor Council, which strives to promote a community of trust on the College Park campus.

**COPYRIGHT PROTECTION OF CLASS MATERIALS**

The lecture class and all other course materials that exist in a tangible medium, such as written or recorded lectures, Power Point presentations, handouts and tests, are copyright protected. Students may not copy or distribute such materials except for personal use and with the instructor’s permission. Students may not download recorded lectures, but may only review them online.

**STUDENTS WITH DISABILITIES**

UMD guarantees appropriate accommodations for students with disabilities. If you require accommodations, please contact me as soon as possible. If you need further clarification, the link to DSS is: http://faculty.umd.edu/teach/specialneeds.html

**DISTRESS**

Sometimes college students experience academic, personal, and/or emotional distress. The Counseling Center in Shoemaker Hall provides comprehensive support services that promote personal, social, and academic success of UMD students. The cost of these services is covered by fees you already paid when you registered, so there is no additional charge if you use these valuable resources. Proactively explore the range of services available including
the Counseling Service, the Disability Support Service, the Learning Assistance Service, and the Testing Office, all described at http://www.counseling.umd.edu/

COURSE OUTLINE AND TIME TABLE
(S) = suggested reading

1. Probability
   (5 lectures)
   (S) HMC: Ch. 1.1-1.3, CB: Ch. 1.1-1.2, MBG: Ch. I

2. Random variables, Distribution Functions and Expectations
   (5 lectures)
   (S) HMC: Ch. 1.5-1.10, CB: Ch. 1.4-1.6, MBG: Ch. II

3. Conditional Probability and Statistical Independence
   (4 lectures)
   (S) HMC: Ch. 1.4, 2, CB: Ch. 1.3, 4, MBG: Ch. IV

4. Special Distributions
   (2 lectures)
   (S) HMC: Ch. 3, CB: Ch. 3, MBG: Ch. III

5. Distributions of Functions of Random Variables
   (4 lectures)
   (S) HMC: Ch. 2.7, 2.8, 3.6, CB: Ch. 2, MBG: Ch. V

6. Point and Interval Estimation
   (4 lectures)
   (S) HMC: Ch. 4.1-4.4, 6, CB: Ch. 5-7, 9, MBG: Ch. VI-VIII

7. Hypothesis Testing
   (4 lectures)
   (S) HMC: Ch. 4.5-4.9, 6, 8, CB: Ch. 8, MBG: Ch. IX

8. Sufficiency
   (2 lectures)
   (S) HMC: Ch. 7.1-7.3, CB: 6, Ch. 8, MBG: Ch. VII

Note: 1 lecture = 1 ¼ hours
ADDITIONAL REFERENCES

The adopted textbooks are widely used for teaching probability and statistics in graduate economics programs. Just in case you are interested in some further readings, here are some additional references.

ASYMPTOTIC DISTRIBUTION THEORY


ADDITIONAL ADVANCED TEXTS


