Economics 507: Statistics for Economists

Fall 2017
WF 11 -12:30

SHA 110
F 4:40 – 5:30
CAS 216

Michael Rife
Office Hours: 8:30 to 9:30 AM
270 Bay State Rd….Rm 317
360-281-9432
gmrife@bu.edu
TA: Batao Shou

Course Description: This is a master's level course in statistics for economists. The purpose of the course is to gain an understanding of the uses and limitations of statistical methods to estimate states of nature that cannot be known with certainty (effects of a policy, income distribution, economic relationships, etc.) The first part of the course provides a foundation in probability and distribution theory. The second part of the course discusses random variables and the distributions of random variables. The third part of the course discusses statistical inference, e.g., hypothesis testing and confidence intervals. The final section of the course is an introduction to regression analysis. The topics covered in this course provide the foundation required to successfully complete the topics in EC 508: Econometrics.

The course will consist of a balance between theoretical and practical applications. Comfort with and a working knowledge of algebra, differential and integral calculus is expected to successfully complete this course. At times some of the problems in the course will involve multiple integration and differentiation. The level of the course is to be slightly below the level of a master's level course of mathematical statistics taught in a MS program in statistics.

There will be an introduction to using STATA in this course. STATA will be used in the analysis of descriptive statistics, hypothesis testing, and linear regression analysis. The use of STATA will be discussed some during the class lectures and in the TA sessions.

Selected materials will be posted on blackboard and may include answers to homework problems and solutions to exams after the assignments/exams are completed.

Textbooks:

Mathematical Statistics with Applications, Wackerly, Mendenhall and Scheaffer, Custom Edition for Boston University (required)

There are several other useful textbooks in the field of mathematical statistics. If you have an interest in knowing what these texts are, please let me know.

Grading: Homework (30%)
Midterm (35%)
Final (35%)

Homework: A substantial amount of homework is assigned in this course because proficiency in mathematical statistics occurs with much practice. The homework for the chapter is due one week after the conclusion of the discussion of the chapter topic in class. The problems to be submitted and graded will be the supplemental problems at the end of each chapter. It will still be useful to do the other assigned problems in preparation for the exams. It is highly recommended

that the student works on the homework problems while we are discussing the topic in class and not wait for the one week time period between the end of discussing the chapter and the due date of the homework. Working on the assignment while we are discussing the topic could lead to useful questions during the presentation of the topic. In addition, procrastination until the one week time period may lead to a lower grade on the homework assignment. Also, it is encouraged that students work together on the homework assignments because better learning of the material usually occurs through student discussion and interaction. However, while working together, please make sure that each individual does close to equal work over the semester. The grading of the assignments will be based on the ratio of the number of problems answered correctly divided by the total number of problems. Late assignments will be accepted but a one correct problem reduction will occur for each class period the assignment is late.

Mid-term and Final Exam: The mid-term and final exams will be accomplished within the classroom. One piece of paper (8.5 inches by 11 inches) will be allowed to be used by the student. This piece of paper will only contain formulas but not any proofs that may be necessary to produce during the exam or written words in any language. The exams will be a combination of theoretical and applied questions. Sufficient lead time will be given concerning the timing of the mid-term exam, e.g., two weeks. The tentative schedule for the first midterm is one week after the lecture on chapter 4. The second midterm will occur one week after the lecture on chapter 7.The final is scheduled for December 16 from 12:30 to 2:30 PM. All exams may be held in the same room as the lectures.

Makeup Exams: There will be no makeup exams for the two midterms. If you miss a midterm due to a documented medical emergency, then the points for that midterm will be added to your final exam. Also, please note that under no circumstances will the final exam or midterms be administered on a different date than scheduled because of travel plans or family events (if, though, there is a family medical crisis, you should contact me about this and I may approve shifting points for a midterm to your final exam). Any changes to an announced exam date, time, or place will be announced in class and posted on the course website (emails will also be sent to the class, but if your mailbox is full you may not get the email). It is the responsibility of the student to be aware of these changes. If a student misses the final due to a documented illness I must be contacted on the day of the exam and every effort must be made to take the makeup final exam as soon as possible (furthermore, no other exams may be taken before the makeup exam for this course is taken, unless you first secure my approval to do so). If a student returns home without first contacting me, no makeup will be given and s/he will receive a zero on the final exam.

Policy on Cheating: Cheating on exams will result in a zero grade for that exam (and this grade will fully count in the final course grade calculation regardless of the grade on the final) and will be reported to the Dean's office. In this regard it is important to remind everyone that students are responsible to know and understand the provisions of the CAS Academic Conduct Code (copies are available in room CAS 105).

Grade Scale: 10 point grading scale (after curving)

Attendance: Students are required to attend lectures (repeated absences may result in a reduced course grade). If you miss class you are responsible for getting lecture notes from a classmate. The structure of knowledge in statistics is strongly hierarchic in that each successive lecture tends to build on prior material in a rather systematic fashion. As such it is very easy to fall behind if you miss a class and do not study the missed material *before* the subsequent lecture.

Class Preparation and Participation: The best way to learn the material (in addition to solving problems) is to read the assigned chapters *before* the lecture, to ask questions *during* the lecture, and then to look over the chapter again and your notes *after* the lecture.
Students with Documented Disabilities: If you have a disability that necessitates extra time for exams, or any other accommodations, you will need to give me a note from the BU office of Disabilities Services *at least two weeks before the first midterm* so that I can make arrangements.

Proposed Topics and Problems Assigned:

Chapter 1: Statistics Introduction: Pg. 6: 1.4, 1.6
Pg. 12: 1.11, 1.17, 1.18
Pg. 16: 1.22, 1.25, 1.26, 1.32, 1.35

Chapter 2: Probability: Pg. 25: 2.1, 2.3, 2.6, 2.8
Pg. 32: 2.11, 2.13, 2.14, 2.18, 2.19
Pg. 39: 2.30, 2.32, 2.34
Pg. 48: 2.40, 2.49, 2.51, 2.58, 2.69
Pg. 55: 2.74, 2.75, 2.77-2.83
Pg. 59: 2.86 – 2.89, 2.92, 2.94, 2.96, 2.104, 2.106, 2.108, 2.109
Pg. 69: 2.117, 2.120
Pg. 73: 2.124, 2.128, 2.131, 2.133
Pg. 77: 2.140, 2.141
Pg. 80: 2.143, 2.146, 2.153, 2.155, 2.157, 2.158, 2.166, 2.167, 2.168, 2.172, 2.175, 2.176

Chapter 3: Discrete Random Variables: Pg. 90: 3.2, 3.6, 3.10
Pg. 98: 3.14, 3.15, 3.21, 3.22, 3.23, 3.31 – 3.33
Pg. 110: 3.41, 3.42, 3.44, 3.45, 3.50, 3.54, 3.55, 3.58, 3.60
Pg. 136: 3.127, 3.134, 3.138, 3.139
Pg. 142: 3.146, 3.151, 3.155 – 3.160
Pg. 147: 3.168
Pg. 151: 3.184, 3.188, 3.195

Chapter 4: Continuous Random Variables: Pg. 166: 4.1, 4.9, 4.11, 4.12 – 4.19
Pg. 172: 4.21, 4.22, 4.24 – 4.26, 4.28 – 4.33
Pg. 176: 4.38, 4.41, 4.43, 4.45 – 4.48, 4.51, 4.52
Pg. 182: 4.61, 4.62, 4.63a, 4.65, 4.66a, 4.68a, 4.69 4.72, 4.73, 4.74 a – d, f, 4.75 – 4.77
Pg. 193: 4.111
Pg. 206: 4.138, 4.139, 4.141, 4.142, 4.144, 4.145
Pg. 209: 4.146, 4.147
Pg. 215: 4.160, 4.165, 4.182, 4.183

Chapter 5: Multivariate Probability Distributions: Pg. 232: 5.4, 5.6, 5.8, 5.9, 5.12 – 5.14, 5.16
Pg. 243: 5.24 – 5.27, 5.30 – 5.32, 5.34
Pg. 251: 5.43, 5.44, 5.48 – 5.51, 5.53, 5.54, 5.56 – 5.61, 5.63, 5.64
Pg. 261: 5.74, 5.75, 5.77, 5.78, 5.82, 5.85, 5.87
Pg. 268: 5.91, 5.94, 5.96, 5.97, 5.100, 5.101
Pg. 276: 5.105 – 5.107, 5.110, 5.112, 5.114,

5.116
Pg. 291: 5.149

Chapter 6: Functions of Random Variables: Pg. 307: 6.2, 6.3, 6.7, 6.10, 6.14 – 6.17
Pg. 316: 6.26 – 6.29, 6.31, 6.33, 6.34
Pg. 322: 6.38, 6.40, 6.43, 6.53, 6.54, 6.57, 6.59
Pg. 330: 6.63
Pg. 341: 6.92, 6.95, 6.111

Chapter 7: Sampling Distributions: Pg. 364: 7.10 – 7.12, 7.15, 7.21, 7.31, 7.35, 7.37, 7.38
Pg. 373: 7.43 – 7.48, 7.58
Pg. 382: 7.73 – 7.75, 7.77, 7.78
Pg. 386: 7.91 – 7.93, 7.95, 7.96

Chapter 8: Estimation: Pg. 394: 8.1, 8.3 – 8.5, 8.8, 8.14, 8.15
Pg. 402: 8.25, 8.27, 8.29
Pg. 409: 8.39, 8.41, 8.42
Pg. 415: 8.50, 8.60, 8.62, 8.64, 8.66
Pg. 424: 8.71, 8.78
Pg. 430: 8.82, 8.83, 8.85, 8.90
Pg. 436: 8.96
Pg. 438: 8.105, 8.107, 8.117, 8.125

Chapter 9: Point Estimators and Estimation Methods: Pg. 447: 9.2, 9.5
Pg. 455: 9.16, 9.18 – 9.21
Pg. 462: 9.43, 9.46
Pg. 470: 9.57, 9.64

Chapter 10: Hypothesis Testing: Pg. 494: 10.3, 10.4
Pg. 501: 10.18 – 10.21, 10.23, 10.24, 10.27, 10.35
Pg. 510: 10.37 – 10.39, 10.42, 10.44
Pg. 512: 10.47, 10.48
Pg. 516: 10.50, 10.54, 10.56, 10.57
Pg. 526: 10.64 – 10.66, 10.69, 10.70, 10.77
Pg. 537: 10.79, 10.81, 10.82, 10.84
Pg. 546: 10.91 – 10.96, 10.98
Pg. 554: 10.105, 10.107, 10.111 – 10.113
Pg. 557: 10.117, 10.119, 10.120 – 10.123, 10.126

Chapter 11: Linear Models and Least Squares: Pg. 572: 11.3, 11.8, 11.8, 11.10, 11.13a
Pg. 582: 11.15, 11.17, 11.18, 11.20 – 11.22
Pg. 586: 11.23, 11.26
Pg. 592: None (material will be covered)
Pg. 602: 11.51 – 11.53, 11.55, 11.56
Pg. 614: 11.67, 11.69, 11.70
Pg. 621: 11.71, 11.73, 11.76
Pg. 630: 11.81, 11.83 – 11.85, 11.88, 11.89
Pg. 634: 11.96, 11.102, 11.103