

Statistics 6302: Theory of Statistical Analysis - Spring 2017

Course Outline

Instructor: Dr. O. Chkrebtii

Lectures: 11:30 am - 12:25 pm on Mondays, Wednesdays, Fridays in Cockins Hall 218.

Office Hours: Monday, 1:30 pm - 2:30 pm (individual appointments may be possible in certain situations, when office hours conflict with other commitments and course work, but should be requested via email and will not be available on short notice).

Email: chkrebtii.1@osu.edu, begin subject with "STAT 6302". Please keep in mind that due to the large volume of emails, I may not be able to answer promptly. Please consider whether your question would be best answered in person during office hours.

Office: 323 Cockins Hall (CH)

Grader: Weiyi Xie

Course Description: Estimation, hypothesis testing, best tests, likelihood ratio tests, confidence sets, sufficiency, efficient estimators; intended primarily for students in the MAS degree program. The topics list is as follows:

1. Method of moments estimators and their properties
2. Maximum likelihood estimators and their properties
3. Efficient estimators; Cramer-Rao Lower Bound
4. Sufficient statistics; exponential families
5. Confidence sets, including approximate and bootstrap confidence intervals
6. Principles of hypothesis testing; duality of confidence intervals and tests
7. Most Powerful and Uniformly Most Powerful Tests
8. Generalized Likelihood Ratio Tests; examples in applied statistics
9. Theory of statistical inferences for comparing two samples
10. Additional discretionary topics, such as theory for contingency tables

Prerequisites: Stat 6301 or Stat 610 or Stat 6801 or Stat 620 or permission of the instructor.

Exclusions: Not open to students with credit for Stat 6802 or Stat 621 or Stat 622 or Stat 623.

Course Website: carmen.osu.edu (login with your web ID). Important announcements, course materials, homework problems and solutions, computing references, and other information about the class are posted on the course website.

Textbook: The reading list and homework problems will be from the course textbook:

- John A. Rice. *Mathematical Statistics and Data Analysis* (Third Edition). Duxbury, 2007.

Optional references include:

- Robert V. Hogg, Joseph W. McKean, and Allen T. Craig. *Introduction to Mathematical Statistics* (Seventh Edition). Pearson, 2013. [an accessible read]
- Larry Wasserman. *All of Statistics* (First Edition). Springer, 2004. [selected chapters]
- Lee J. Bain, Max Engelhardt. *Introduction to Probability and Mathematical Statistics* (Second Edition). Duxbury, 1987. [more theoretical, but not to the point of being inaccessible]

Course notes are based on material from these texts. More references are available upon request.

Course Materials: Partial notes will be posted on Carmen on the day before each class. These contain blank spaces, which I will fill in during the lecture. I will not share the marked-up slides, so please make arrangements with your classmates to obtain any missed class material. Please make sure that you understand and can do all the examples that we cover in class.

Homework and Project Assignments: You may discuss the problems with each other in general terms, but you must write your own homework solutions. *Use of homework solutions distributed in previous offerings of the course or solutions available on the web constitutes academic misconduct and will be handled according to university rules.* Late submissions will absolutely not be accepted. Starting and trying to get help early will be helpful. Academic misconduct of any sort will not be tolerated. Please review OSU's policies at <http://studentaffairs.osu.edu/csc/>.

Test and Assignment Policy: No late assignment submissions will be accepted. Electronic assignment submissions will not be accepted. Missed tests or exams require formal documentation specifically stating that the test/exam was missed for this reason. Succeeding in this class requires practice. My tests are challenging and require conceptual understanding of the topics including all the prerequisites. It is not enough to just memorize formulas or procedures.

Special Considerations: If a situation exists or arises that you think may hinder your progress in this class, you must notify me as soon as possible.

Advising: For questions related to prerequisites and course suggestions, please contact the Statistics Department's Graduate Studies Associate, Michelle Lee (lee.2293@osu.edu).

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic

misconduct. The term “academic misconduct includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.

Disability Services: Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu/>.

Grading:

Assignments 20% ;

First Test 20 %, in class on Monday, February 20, 2017;

Second Test 20 %, in class on Friday, March 31, 2017;

Final Exam (cumulative) 40 %, see OSU official exam schedule.

Re-grading of assignments or tests: Should there be any concerns with the grading, students must follow the procedure below. Any grade disputes should be clearly stated in a note submitted to me in writing along the assignment/test/project within *at most* two weeks of the date on which the grade was returned. Errors such as ungraded sections or problems with addition will be resolved, but any submission that requires interpretation or explanation will undergo a full re-grading. That is, there is the possibility that *your grade may increase or decrease* as a result.

As always, there are no exceptions, no arbitrary grade adjustments for individual students, nor grade guarantees of any kind, for any reason. However, if you fundamentally disagree with your final grade, you have recourse to a formal dispute through the university. The information is available here: <http://www.gradsch.osu.edu/i.-overview-grievance.html>.