Description

STATS426 introduces the principles and mathematical foundations of statistical reasoning. Topics include parameter estimation, hypothesis testing, analysis of variance, regression, nonparametric procedures, Bayesian methods, and the delta method.

Prerequisites
Students are required to have taken STATS425 or equivalent, and to have taken or currently be taking MATH 217, 412 or 451.

Instructor

Keith Levin, klevin@umich.edu
Office: West Hall 256
Instructor office hours: Wednesdays 5:30pm to 7pm in 438 WH, or by appointment.

GSI

Rafail Kartsiokas, rkarts@umich.edu
GSI office hours: Mondays and Tuesdays, 3:30pm to 5pm, SLC (2165 USB).

Meetings

Lecture: Tuesdays 5:30pm to 7pm in B844 East Hall, Thursdays 5:30 to 7pm in 2260 Undergraduate Science Building

Textbook, Readings & Online Resources
The vast majority of this course will use *Mathematical Statistics and Data Analysis* (3rd Edition, 2007) by John Rice. Occasional supplemental readings will be supplied throughout the semester. These supplemental materials will be made available on the course web page, [http://www.umich.edu/~klevin/teaching/Fall2019/STATS426/](http://www.umich.edu/~klevin/teaching/Fall2019/STATS426/) and on the course Canvas page. Please contact the instructor if any resources are missing from either of these websites. It is recommended, though not required, that students complete assigned readings before lecture.

Course Topics

- **Probability Models and Experiments.** Sampling, laws of large numbers, central limit theorem.
- **Testing and Confidence Intervals.** Neyman-Pearson framework, likelihood ratio tests, duality of testing and confidence intervals.
- **ANOVA.** One- and two-way layouts, multiple comparison.
- **Regression.** Simple linear regression, linear least squares.
- **Asymptotics.** Asymptotics of MLEs, delta method.
Grading and Homeworks
The course will include two mid-term exams (each 25% of your grade) and a cumulative final exam (40% of your grade), as well as (approximately) weekly homeworks throughout the semester (10% of your grade). Students may contest their grade on an assignment up to two (2) weeks from the day that an assignment’s grades are released, after which grades may not be changed. Homeworks are due in class on the listed due date, before the end of lecture. Homework due dates are strict, and late homeworks will not be accepted, no exceptions. Of course, if dire circumstances arise (e.g., long-term illness that causes you to miss multiple weeks of lecture), please speak with me as promptly as possible so that we can make arrangements. Letter grades will be determined at the end of the course after all exams and homeworks have been collected and graded. The following grading rubric is approximate, and adjustments may be made based on overall class performance.

- 92%–100% A; 87%–91% A-
- 83–86% B+; 79%–82% B; 76%–78% B-
- 72%–75% C+; 68%–71% C; 64%–67% C-
- 55%–63% D
- Below 55% F

Key Dates
First lecture: Tuesday, September 3, 2019
Last lecture: Tuesday, December 11, 2019
Exam 1: Thursday, October 17, in class.
Exam 2: Thursday, November 21, in class.
Final exam: Tuesday, December 17, 2019, 7pm-9pm. 296 Weiser Hall.

Ethics and class policies
Academic misconduct includes such actions as copying from the web or from your fellow students, looking up solutions online, turning in assignments from other classes or previous iterations of this course, and hiring others to complete your work for you. You are welcome to discuss homework assignments with your classmates, but you must disclose the names of those you spoke with in your homework. From the LSA Community Standards of Academic Integrity:

Academic dishonesty may be understood as any action or attempted action that may result in creating an unfair academic advantage for oneself or an unfair academic advantage or disadvantage for any other member or members of the academic community. Conduct, without regard to motive, that violates the academic integrity and ethical standards of the College community cannot be tolerated.

See https://lsa.umich.edu/lsa/academics/academic-integrity.html for more information. Violations of these or other university ethical standards surrounding academic honesty will be met with serious consequences and disciplinary action. Cheating on an assignment will result in a 0 for that assignment and the incident will be reported to the appropriate office. At the instructor’s discretion, depending on the circumstances, an additional full letter grade may be deducted from the student’s final grade in the course.

Accommodations for Students with Disabilities
Please let me know as promptly as possible if you need accommodation for a disability. Some aspects of this course may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Services for Students with Disabilities (SSD) office to help us determine appropriate academic accommodations. SSD (734-763-3000) typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form. Any information you provide is private and confidential.