SYRACUSE UNIVERSITY, FALL 2018 SYLLABUS

MAT 525, Mathematical Statistics

General Information

Course Meetings: Mon & Wed 8:00AM - 9:20AM in Carnegie 100.
Instructor: Thomas John, Ph.D.
Contact Information: Office: Carnegie 313D, Phone: 315-443-1587, email: thjohn@syr.edu.
Office Hours: Mon & Wed 10:00AM- 11:30AM.

Special Note on the Drop Deadline:

Academic Drop Deadline and the Financial Drop deadline will both occur on Monday, September 17 (three weeks from the first day of classes). Students may still withdraw from courses after September 17 but before the withdraw deadline Fri, November 16, 2018; this would place a "WD" grade on their transcripts.

Course Catalogue Description:

Estimation and confidence intervals. Normal distribution and central limit theorem. Testing hypotheses, chi-square, t, and F distributions. Least squares, regression, and correlation.
Prereq: MAT 521 or graduate standing in mathematical sciences

Course Overview:

Course will cover key topics of mathematical statistics. At a high level, the goal of the course is to build the mathematical theories of the following: statistical estimation, properties and assessment of estimators, and statistical inference procedures. The key point estimation theory topics to be discussed are the maximum likelihood and the method of moments. Theory of properties and assessment will focus on unbiasedness, sufficiency, efficiency, consistency, and minimum variance. Statistical inference theory will deal with confidence intervals, hypotheses testing, regression, and analysis of variance.

Text:

- Free online textbook: *Probability and Mathematical Statistics*, Prasanna Sahoo, University of Louisville. Link: www.math.louisville.edu/~pksaho01/teaching/Math662TB-09S.pdf
  - Chapters (sections) to cover: 13 (13.1-13.5), 14 (14.1-14.2), 15 (15.1-15.2), 16 (16.1-16.5), 17 (17.1-17.3, 17.6, 17.8), 18 (18.1-18.4), 19 (19.1-19.2), 20 (20.1-20.3), 21(21.1-21.2).
- Additional references:
  - *Probability and Statistics*, 4th Ed, DeGroot and Schervish

Grading:

Your final grade will be based on two semester exams (25% each), a cumulative final exam (30%), quiz/HW/class participation (20%). Final letter grades will be given according to the following scale:

A (93-100); A- (90-92); B+ (87-89); B (83-86); B- (80-82);
C+ (77-79); C (73-76); C- (70-72); D (60-70); F (0-59)

Exam Dates:

- Semester Exam 1: Wednesday, October 3
- Semester Exam 2: Wednesday, November 7
- CUMULATIVE FINAL EXAM: Monday, December 10, 2018, 8:00AM - 10:00AM

Special Note on the Final Exam:

All students must take the cumulative final exam at the scheduled time on Monday, December 10, 2018, 8:00AM - 10:00AM. There will be no exceptions, and so you should not plan to leave campus before 10 AM on Monday, December 10, 2018.

(No) Makeup Policy:

There will be absolutely no make-ups for any reason. If you miss a quiz/test for a valid reason (which must be verified by a note from a physician or your dean's office), performance from the corresponding part of a test/final will be used as replacement.

Homework:

Homework will be assigned regularly and some of the problems may be asked to be turned in. You may discuss these problems with other students, but each of you is expected to write up your own solutions independently. The ***best*** way to learn this material is to do homework problems. Try as much as possible to do the homework on your own.

Quiz:

There will be quizzes given frequently. These quizzes will be one or two problems very similar to the examples done in lecture and homework problems. The specifics will be announced in lecture ahead of time.

Attendance:

You are expected to attend every class and every exam. If you miss a class, it is your responsibility to obtain a copy of the lecture notes for that class from another student. You are also responsible for any announcements about changes to the course schedule, the exam schedule, or the course requirements that were made during that class.

Phone, Laptop, Tablet in class policy:

Phones, laptops, tablets, and similar electronics are not allowed to be out during class. **This policy will be strictly enforced in class. Repeated violations of this policy will be recorded.** Students who repeatedly violate this policy will be asked to leave the room and the overall course grade will be affected by such behavior. Particularly, calculators on cell phones cannot be used on quizzes/tests.

Calculators:

You will need a calculator to do the computations that will arise throughout the course. No specific calculator is required, but TI-84 or TI-83 graphing calculator is highly recommended. Calculators are not to be shared during exams and quizzes. Also, calculators on cell phones cannot be used on quizzes/tests.

Regardless of the calculator that is being used, calculators with symbolic manipulation capabilities (such as TI-89, TI-92, TI-Nspire CAS etc.) cannot be used to do calculus (differentiation/integration). For any derivatives/integrals, sufficient steps must be shown to receive credit on HW/quizzes/exams.

Statistical Software:

Students are expected to learn to use statistical software appropriately. There are several options available. The ITS Public Computer Labs have IBM SPSS Statistics, Minitab, R for Windows, and SAS. To see the software available at the clusters, see https://answers.syr.edu/display/itsservapp011/ITS+Computer+Labs. Since R is a free and very reputable software, I will be using it for illustration. Student is expected to learn to use it on their own using the rich resources available on the internet. For some pointers on getting started, please see my page http://thjohn.mysite.syr.edu/Rnotes_thjohnAtSyrEdu.html.

Students with Disabilities:

If you believe that you need academic adjustments (accommodations) for a disability, please contact the Office of Disability Services (ODS), visit the ODS website http://disabilityservices.syr.edu, located in Room 309 of 804 University Avenue, or call (315) 443-4498 or TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting academic adjustments. ODS is responsible for coordinating disability-related academic adjustments and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since academic adjustments may require early planning and generally are not provided retroactively, please contact ODS as soon as possible. Making

arrangements with ODS takes time. Do not wait until just before the first test. Students taking exams at ODS should take them at times which overlap the exam time for the rest of the class.

Religious observances policy:

SU religious observances policy recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to are religious observance provided they notify their instructors before the end of the second week of classes. For fall and spring semesters, an online notification process is available through MySlice (Student Services > Enrollment > My Religious Observances) from the first day of class until the end of the second week of class.

Related link:
https://policies.syr.edu/policies/university-governance-ethics-integrity-and-legal-compliance/religious-observances-policy/.

Academic Integrity:

Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice.

Specifically for this course, the academic integrity aspects relate to quizzes/exams. A student is not allowed to use ANY electronic device except for their calculator during the quiz/exam until the quiz/exam is handed in. Accessing material beyond standard calculator functionalities and any statistical table provided during the quiz/exam will be a violation of academic integrity.

The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in course failure regardless of violation level.

Related link: http://class.syr.edu/academic-integrity/policy/

Learning Objectives:

After taking this course, students will be able to:

- understand basic ideas of statistical inference;
- calculate, estimate, and manipulate probabilities and random variable distributions commonly used;
- conduct, with and without the aid of technology, probability model determinations and assessments;
- choose appropriate mathematical models to solve statistical problems;
- understand theoretical basis of fundamental inferential procedures;
- apply statistical software and interpret their output for real data analysis.