Syllabus
MAT 525: Introduction to Probability and Statistics, 2017 Fall

Place & Time: Carnegie 110, Tuesdays & Thursdays 11:00 am to 12:20 pm

Instructor: Professor Pinyuen Chen
Carnegie 316 B, 443-1577, pinchen@syr.edu
Office Hours: Tuesdays Thursdays 9:30 am to 10:30 am & by appointments.

Text: *Probability and Statistics*, 4th Edition, Morris H. DeGroot and Mark J. Schervish, Addison Wesley

Course Description:

Most contents in Sections 5.6 – 10.3 of the textbook will be covered.

The course will discuss statistical estimation and hypothesis testing. Point estimation will be taught with discussion on efficiency. Interval estimation and hypothesis testing will be discussed focusing on the likelihood ratio test. Goals of this course would be to understand basic ideas of statistical inference (estimation and testing), to learn theoretical basis of fundamental inferential procedure, and to apply them in real data analysis.

See Page 2 for details.

Prerequisite: Calculus and MAT 521 or equivalent. You need at least 12 credit hours of calculus to be able to handle the multiple integration and infinite series in the course.

Calculator: You will need a calculator for the course. No specific calculator is required.

Grading Policy: Homework & Quizzes (10%), Exam 1 (25%), Exam 2 (25%), Final Exam (40%)

Course Rules:

1. There will be **NO** make-up quizzes and exams.
2. Students are expected to attend the class. Attendance record collected through quizzes and class surveys will be considered toward the extra credit.
3. Homework may be collected based on the availability of the grader. Quiz problems will be similar to HW questions.
4. All cases of academic dishonesty will result in a grade of "F" and will be reported to the Office of the Dean.
5. Students with disabilities who need special accommodations should contact the instructor as soon as possible.

MAT 525 Tentative Schedule

Course Schedule:

Tuesday 8/29
- D & S 5.6 The Normal Distributions

Thursday 8/31
- D & S 5.7 The Gamma Distributions

Tuesday 9/5
- D & S 5.8 The Beta Distributions

Thursday 9/7
- D & S 6.2 The Law of Large numbers
- D & S 6.3 The Central Limit Theorem

Tuesday 9/12
- D & S 6.4 The Correction for Continuity
- D & S 7.5 MLE

Thursday 9/14
- D & S 7.6 Properties of Maximum Likelihood Estimators;
- D & S 7.7 Sufficient Statistics

Tuesday 9/19
- D & S 7.8 Joint Sufficient Statistics
- D & S 7.9 Improving an estimator

Thursday 9/21
- **Exam 1**

Tuesday 9/26
- D & S 8.1 Sampling Distribution;

Thursday 9/28
- D & S 8.2 Chi-Square distribution;

Tuesday 10/3
- D & S 8.3 Sample mean and sample variance;

Thursday 10/5
- D & S 8.4 The t Distribution.

Tuesday 10/10
- D & S 8.5 Confidence Intervals

Thursday 10/12
- D & S 8.7 Unbiased Estimators

Tuesday 10/17
- D & S 8.8 Fisher Information

Thursday 10/19
- D & S 9.1 Testing hypotheses

Tuesday 10/24
- D & S 9.2 Testing Simple Hypotheses

Thursday 10/26
- Exam II

Tuesday 10/31
- D & S 9.3 Uniformly Most Powerful Tests

Thursday 11/2
- 9.4 Two-Sided Alternatives

Tuesday 11/7
- D & S 9.5 The t tests

Thursday 11/9
- D & S 9.6 Comparing the Means of two Normal Distributions

Tuesday 11/14
- D & S 9.7 The F distribution

Thursday 11/16
- D & S 10.1 Tests of Goodness of Fit

Tuesday 11/28
- D & S 10.2 Goodness of Fit for composite Hypotheses

Thursday 11/30
- D & S 10.3 Contingency Table

Tuesday 12/5
- **Review**

Thursday 12/7
- **Review**

Thursday 12/14

- **3 pm – 5 pm, FINAL EXAM**

Learning Goals

Students will be expected to

1) use and understand basic mathematical notation;
2) select and apply an appropriate mathematical model for certain elementary probabilistic problems;
3) do basic hand calculations with accuracy;
4) use appropriate hardware and/or software related to certain probability distributions.

Students with Disabilities: If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), http://disabilityservices.syr.edu, located in Room 303 of 804 University Avenue, or call 315-443-4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible coordinating disability-related accommodations and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible. You are also welcome to contact me privately to discuss your academic needs although I cannot arrange for disability-related accommodations.

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.

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. For more information and the complete policy, see http://class.syr.edu/academic-integrity/policy/

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 a 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.