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

Instructor: Professor Pinyuen Chen
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Office Hours: Mondays, Tuesdays, Wednesdays 1 pm to 2 pm.

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 (15%), Exam 1 (15%), Exam 2 (15%), Exam 3 (15%), 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.

Course Schedule:

Wednesday 1/18
- D & S 5.6 The Normal Distributions

Monday 1/23
- D & S 5.7 The Gamma Distributions

Wednesday 1/25
- D & S 5.8 The Beta Distributions

Monday 1/30
- D & S 6.2 The Law of Large numbers
- D & S 6.3 The Central Limit Theorem

Wednesday 2/1
- D & S 6.4 The Correction for Continuity
- D & S 7.5 MLE

Monday 2/6
- D & S 7.6 Properties of Maximum Likelihood Estimators;
- D & S 7.7 Sufficient Statistics

Wednesday 2/8
- D & S 7.8 Joint Sufficient Statistics
- D & S 7.9 Improving an estimator

Monday 2/13
- **Exam 1**

Wednesday 2/15
- D & S 8.1 Sampling Distribution;

Monday 2/20
- D & S 8.2 Chi-Square distribution;

Wednesday 2/22
- D & S 8.3 Sample mean and sample variance;

Monday 2/27
- D & S 8.4 The t Distribution.

Wednesday 3/1
- D & S 8.5 Confidence Intervals

Monday 3/6
- D & S 8.7 Unbiased Estimators

Wednesday 3/8
- D & S 8.8 Fisher Information

Monday 3/20
- **Exam 2**

Wednesday 3/22
- D & S 9.1 Testing hypotheses

Monday 3/27
- D & S 9.2 Testing Simple Hypotheses

Wednesday 3/29
- D & S 9.3 Uniformly Most Powerful Tests

Monday 4/3
- 9.4 Two-Sided Alternatives

Wednesday 4/5
- D & S 9.5 The t tests

Monday 4/10
- D & S 9.6 Comparing the Means of two Normal Distributions

Wednesday 4/12
- D & S 9.7 The F distribution

Monday 4/17
- **Exam 3**

Wednesday 4/19
- D & S 10.1 Tests of Goodness of Fit

Monday 4/24
- D & S 10.2 Goodness of Fit for composite Hypotheses

Wednesday 4/26
- D & S 10.3 Contingency Table

Monday 5/1
- **Review**

Wednesday 5/10
- **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: The Syracuse University Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the Policy and know that it is their responsibility to learn about instructor and general academic expectations with regard to proper citation of sources in written work. The policy also governs the integrity of work submitted in exams and assignments as well as the veracity of signatures on attendance sheets and other verifications of participation in class activities. Serious sanctions can result from academic dishonesty of any sort. For more information and the complete policy, see http://academicintegrity.syr.edu

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.