SYRACUSE UNIVERSITY
MAT 421, APPLIED PROBABILITY AND STATISTICS
SPRING 2015 SYLLABUS

SECTION: M002 (Class No: 50948)
Class: Tue & Thu 9:30AM - 10:50AM in Carnegie 122
Instructor: Thomas John, Ph.D.
Contact Info: Office: Carnegie 219A, Phone: 443-1587, email: thjohn@syr.edu
Office Hours: Tue & Thu 11:30AM - 1:00PM and by appointment

Course Catalogue Description: Sample spaces, counting, random variables and their distributions, expected value, central limit theorem. Estimation and confidence intervals, hypothesis tests, analysis of variance and regression. MAT 421 does not count towards the Mathematics or Applied Mathematics major or minor. Cannot be taken for credit after successfully completing MAT 521.

Course Description: This is a one-semester calculus-based introduction to probability and statistics for students in engineering and the life sciences. Students who have taken 12 credits of calculus equivalent to MAT295-397 may wish to take instead the sequence MAT521-525, which covers similar material more broadly and in greater depth. (Students interested in stochastic processes rather than mathematical statistics may follow MAT521 with MAT526.)

Text: *Probability and Statistics for Engineering and the Sciences*, 8th Edition,
   by Jay L. Devore, ISBN-13: 9780538733526.
   See Cengage website for our course at http://www.cengagebrain.com/micro/1-1TANMME

Mathematics Prerequisite: MAT 286 OR 296

Grading: Grades for the course will be based on the total number of points accumulated on homework, quizzes, three tests, and the final. The three tests will count 20% each, the homework & quizzes 15% and the cumulative final exam 25% toward your grade. There will be absolutely no make-ups for any reason. If you miss a quiz/test for a valid reason (which <u>must</u> 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.

Exams: The dates for the exams are:

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Test 1: Thursday, February 12
Test 2: Thursday, March 26
Test 3: Thursday, April 23
Final: Friday, May 1, 8:00AM - 10:00AM

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The final will only be given at this time, so do not make plans to leave town before 10:00AM on Friday, May 1.

Homework: Homework will be assigned regularly and some of the problems will 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 <u>best</u> way to learn this material is to do homework problems. You cannot learn mathematics by watching someone else perform it any more than you can learn to play violin by attending a concert. Try as much as possible to do the homework on your own.

Quiz: There will be a quiz almost every other lecture. These quizzes will be one or two problems very similar to the homework problems. The specifics will be announced in lecture ahead of time.

Attendance: You are expected to attend every class, every exam, and the final 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.

Cell Phones: Cell phones should be turned off and put away during class. **This policy will be strictly enforced in class. Repeated violations of this policy will be recorded and overall course grade will be affected by such behavior.** Particularly, calculators on cell phones cannot be used on quizzes/tests.

Technology: 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 (see http://its.syr.edu/computer-labs/labsoftware.pdf). 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.

Learning Goals and Expectations: The successful student will
- calculate, estimate, and manipulate probabilities and random variable distributions, including the normal, poisson, binomial, and gamma distributions;
- appreciate the centrality of the normal distribution;
- conduct, with and without the aid of technology, standard statistical procedures, such construction of confidence intervals and hypothesis testing;
- interpret the output of statistical software;
- understand and critically evaluate statistical results reported in the literature and media.

Outline: The course is divided into 3 units, covered *approximately* by each test listed above.
- <u>Unit 1</u> covers some descriptive statistics, foundations of elementary probability theory, random variables and their distributions in the discrete case. Approximately 9 lectures: Chapter 1 (2 lectures), Chapter 2 (4 lectures), 3.1-3.4 and 3.6 (3 lectures).

- <u>Unit 2</u> finishes the introduction to probability theory, including continuous distributions, special distributions (normal, gamma), sampling distributions of statistics. The study of statistical inference is begun with a brief introduction to point and interval estimation. The t-distribution is introduced. Approximately 9 lectures: 4.1-4.4 (3 lectures), 5.1-5.4 (3 lectures), chapter 6 (1 lecture), 7.1-7.3 (2 lectures).

- <u>Unit 3</u> introduces hypothesis testing methodology, one sample z and t tests, 1-way and 2-way analysis of variance, and linear regression. Approximately 8 lectures: 8.1-8.5 (3 lectures), 10.1-10.2 (2 lectures), 11.1 (1 lecture), 12.1-12.3 (2 lectures).

Spring 2015 - Academic Calendar Dates:
- Financial deadline to drop class: Monday, February 2
- Academic drop deadline: Tuesday, March 17
- Withdrawal deadline: Tuesday, April 14

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.