STAT 515 Statistics I
Section 4: TuTh 1:00 PM – 2:15 PM, LGRC A201
Section 5: TuTh 2:30 PM – 3:45 PM, Hasbrouck Lab 113
Discussion sessions TBD.

Instructor:

- Professor: Yao Li
  Office: LGRT 1340; Email: `yaoli@math.umass.edu` (preferred); Tel: 545-4254
  Office Hours: TuTh 11:00AM – 12:00PM or by appointment

Prerequisite: MATH 131, MATH 132 or equivalent with a grader of "C" or better. MATH 233.

Texts: Mathematical Statistics with Applications, 7th edition, by Wackerly, Mendenhall, Scheaffer
    We are NOT using the international edition. If you use the international edition or older editions, you must consult for homework assignments with the library copies on reserve.

Course Description

This course provides a calculus based introduction to probability (an emphasis on probabilistic concepts used in statistical modeling) and the beginning of statistical inference (continued in Stat516). Coverage includes basic axioms of probability, sample spaces, counting rules, conditional probability, independence, random variables (and various associated discrete and continuous distributions), expectation, variance, covariance and correlation, the central limit theorem, and sampling distributions. Introduction to basic concepts of estimation (bias, standard error, etc.) and confidence intervals.
    We will cover the following topics.

- Chapter 2: All sections

- Chapter 3: 3.1 - 3.9, 3.11

- Chapter 4: 4.1 - 4.10

- Chapter 5: 5.1 - 5.8, 5.10, and 5.11

- Chapter 6: 6.1 - 6.5

- Chapter 7: 7.1 - 7.3, 7.5

Below is a tentative weekly schedule that is subject to minor change.

- Week 1: Review syllabus, 2.1-2.5 Introduction, set theory, axioms of probability

- Week 2: 2.6-2.9, Probability and counting, laws of probability I

- Week 3: 2.10-2.12, 3.1, 3.2, laws of probability II, random variables

- Week 4: 3.3-3.7, discrete random variables I

- Week 5: 3.8, 3.9, 3.11, discrete random variable II, moment generating function, Chebyshev's inequality, review for midterm I

- Week 6, No Tuesday class, Midterm I on Wednesday, 4.1, 4.2, continuous random variables

- Week 7, 4.3-4.7, continuous distributions

- Week 8, 4.8-4.10, 5.1, 5.2, moment generating function and Chebyshev's inequality for continuous random variables, multivariate random variables.

- Week 9, 5.3-5.6, marginal and conditional distribution, independence

- Week 10, 5.7-5.9, 5.11, covariance, sum of random variables, conditional expectation

- Week 11, Midterm II on Wednesday, Review for Midterm II, 6.1, 6.2, 6.3, functions of random variables I

- Week 12, Thanksgiving break

- Week 13, 6.4-6.5, 7.1, functions of random variables II, sampling

- Week 14, 7.2, 7.3, 7.5, central limit theorem and sampling

- Week 15, Review for Final

The grade will be based on homework assignments, class participation, and exams.

Required Work

The required work for the course will consist of weekly homework assignments, two in-class midterm exam, and one final exam.

Class Participation

Your participation is necessary in order to make this course a success. I expect that you will attend every class, will not enter the classroom late, and will complete the reading and the assignments on time. In case of any problems affecting your work, please see me when they happen. I will try to help you. If unable, I will direct you to someone who can help.

Homework

Homework is an important component of this course. You are expected to express your ideas rigorously, clearly, legibly and completely. Late homework will be graded with a 50% penalty unless you have my permission. Unreadable work, scratching out, etc. will not be graded.

The weekly homework will by typically of two types. **Online homework on Webwork** is due on every Tuesday. I will reopen all Webwork sessions for 48 hours before the final exam for you to make up. You can login into your account on Webwork from https://webwork.math.umass.edu/webwork2/F19_STAT_515_4/ for Section 04 and https://webwork.math.umass.edu/webwork2/F19_STAT_515_5/ for Section 05. Your user name is the part of your SPIRE username (UMass email address appearing before the '@ ' symbol and usually your NetID). Your default password is your 8 digit UMass SPIRE ID number. Please make sure you change your password once you login for the first time. Write-up/Print your solutions, and keep them, say in a binder, so that you may easily reference that when you are studying for an exam.

We also have **written homework** assignment consists $5 - 10$ written problems. Please turn in written homework in class on Thursdays. By all means you may work in groups on the homework assignments. Collaboration is a big part of learning and of scholarship in general. However, each student must turn in his or her own write-up of the solutions, with an **acknowledgment of collaborators**.

If attendance starts to drop, there MAY be several unannounced short in-class quizzes that will supplement the homework grade component. One quiz will have the same weight as a regular written HW. These quizzes will be relatively easy. Some may be individual and some group efforts. When calculating the final grades, the lowest n quizzes or HWs will be dropped, where n equals to the total number of quizzes. (In other words, you can use quizzes to replace some low HW grades.)

Exams

During the semester there will be two midterm exam and one final exam. The first midterm will be closed-book on October 9th 7-9pm. The second midterm will be given on November 14th 7-9pm. The final exam will be given on December 17th 1-3pm. The final is cumulative, with emphasis on post-midterm 2 material.

I may approve out-of-sequence exams in the following cases:

1. A documented medical excuse;

2. A University sponsored event such as an athletic tournament, a play, or a musical performance. Athletic practices and rehearsals do not fall into this category. Please have your coach, conductor, or other faculty advisor contact me.

3. A religious holiday

4. Extreme hardship such as a family emergency

Requests must be made at least one week before the actual exam.

I will not accommodate out-of-sequence exams, quizzes or finals for purposes of more convenient travel, including already purchased tickets.

Grading

Item	Weight
Homework + Quiz	35%
Midterm Exam	$20 \times 2\%$
Final Exams	25%
Total	100%

The course score will be converted to a letter grade beginning with these values as cutoffs:

A	A-	B+	B	B-	C+	C	C-	D+	D	F
90	87	83	79	75	71	67	63	59	55	< 50

These cutoffs might be adjusted, but only in the downward direction (to make letter grades higher).

Drop, Withdrawal, and Incomplete

The last day to drop/add with no record is September 16th. The last day to drop with a W is October 29th.

An incomplete is possible only if all of the following apply: (1) you have a compelling personal reason, e.g., serious illness; (2) your work so far would receive a passing grade; and (3) there is a good chance you will complete the course with a passing grade within the allotted time. Thus, *expecting to fail the class is no reason to ask for an incomplete.*

Class etiquette statement

- Except for emergency, do not send text messages/emails or make/receive phone calls during lectures.

- If you arrive late to class, sit in the first seat you can find so as not to disturb others, and do not come up to the front of the room to pick up or hand in papers.

- You can use laptops and tablets during class provided that you do not disturb your fellow classmates or my lectures (for example: mute the speaker). They are not allowed during exams.

- Please read *Guidelines for Classroom Civility and Respect*: http://www.umass.edu/dean_students/campus-policies/classroom

Academic integrity statement

Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Massachusetts Amherst. Academic dishonesty is prohibited in all programs of the University. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty. Instructors should take reasonable steps to address academic misconduct. Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. Instances of academic dishonesty not related to a specific course should be brought to the attention of the appropriate department Head or Chair. Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not normally sufficient evidence of lack of intent.

Please read *Academic Honesty Policy and Procedures*: http://www.umass.edu/ombuds/honesty.php/

Information on In-Class Recordings by Students and Selling of Notes

We have seen a growth over the last couple of years in external vendors (i.e., StudySoup) and other outlets who recruit (and pay) students for their Notes from a class which is then posted for any other student to purchase and use. We have also seen this extend to in-class video recordings of class lectures. Please note that you can only use the notes you take from class for your own personal

use, and not share (sell) these notes via an outside vendor or entity without the faculty/instructor's permission. This pertains to in-class recordings as well. **Usage of the notes or in-class recordings in this way without the faculty member's permission is a violation of the faculty member's copyright protection.**

Accommodation Statement

The University of Massachusetts Amherst is committed to providing an equal educational opportunity for all students. A student with a documented physical, psychological, or learning disability on file with Disability Services (DS) may be eligible for reasonable academic accommodations to help succeed in this course. If you have a documented disability that requires an accommodation, please notify the instructor within the first two weeks of the semester so that we may make appropriate arrangements.