

Lamar University
Department of Mathematics

MATH 3370-03: Introduction to the Theory of Statistical Inference (3 hour course)

Fall 2017 Syllabus

TR 9:35-10:55; L-114

Instructor: Paul Chiou, Ph.D.
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Office Hours: TR 11:00-12:00; 1:20-2:20, and others by appointment
Textbook: Probability & Statistics for Engineering and the Sciences (9th edition) by Jay Devore
Prerequisites: Grade of C or better in Math 2414; Prepare for Math 4380

Catalog Description: A calculus-based introduction to statistics, probability, special probability distributions, nature of statistical methods, sampling theory, estimation, and testing hypotheses

Student Learning Outcomes: Students who successfully complete the course will:

1. Define a sample space for an experiment;
2. Compute the probability of an event;
3. Apply the laws of probability to calculate the probability of a compound event;
4. Distinguish between an independent and dependent event;
5. Illustrate the concept of discrete and continuous random variables;
6. Distinguish between the pmf of a discrete random variable and the pdf of a continuous random variable;
7. Describe some special named distributions;
8. Describe a transformation of a random variable;
9. Describe a random sample and the sampling distribution of sample mean;
10. Define statistic and describe its distribution;
11. Use the central limit theory;
12. Identify conditions under which a binomial or a Poisson distribution could be approximated by a normal distribution;
13. Describe the point estimation and interval estimation for a population mean;
14. Describe the theory for hypothesis testing.

Lectures/Discussions: Chapters 1, 2, 3, 4, 5, 6, 7, 8, and 9 of the text will be covered. See the list of sections, topics, and suggested problems for the course below. The listed sections and topics will be mainly conveyed through the traditional lecture format. If you should have difficulties in the course, please stop by L-203 or L-209 during my office hours for help.

Grading Policies: Tests will occur approximately at the end of Chapters 2 and 5. Each of these two tests will count 20% of your final grade. The final exam will count 20% of your final grade. Test reviews will be posted on Blackboard before the tests. Homework will be assigned regularly, but only the group assignments will be graded. However, if you put a complete solution on the board

before class for any suggested problems on the list below from the last two covered sections, you receive one point added to your next test grade (only one problem per class period and none on the day of a test). It is expected that you solve all the problems as assigned. You can expect the tests to contain problems similar to those as assigned. The graded homework will count 30% of your final grade. Missed work can be made up only if there is extenuating circumstance with documentation. It is expected that you will be regular and punctual in attendance. Attendance and class participation will count 10% of your final grade. The grading scale is as follows: A 90-100; B 80-89; C 70-79; D 60-69; F < 59.

Final Exam: Tuesday, December 12, 2017, 9:35 - 10:55

Electronic Devices: Electronic devices are not allowed during class period except the case that you use an e-book for the course. Please turn off or silence your phones, and put your iPads and iPods away.

Important Dates: See the following important dates for the semester.

September 20 - last day to drop or withdraw without consulting with the instructor
October 6 - last day to drop or withdraw without academic penalty
November 10 - last day to drop or withdraw with academic penalty
December 12 - final examination

Important Information for Students

Lamar University expressly prohibits intimidation and harassment of students, faculty, staff, or applicants. <http://dept.lamar.edu/studentaffairs/handbook.htm>

Drop Policy: Please make note of the three dates indicated in this drop policy. Any drop will be your responsibility; I will not drop a student from the course.

September 20, 2017: (Census Date-Six Drop Rule does not apply) A student may drop or withdraw without consulting with the instructor. The Six Drop Rule does not apply to a drop before 5:00 PM.

October 6, 2017: (Six Drop Rule applies) A student may drop or withdraw from the course without academic penalty and receive a Q, however, the Six Drop Rule applies. The student will consult with the instructor and the Records Office to initiate a drop.

November 10, 2017: (Six Drop Rule applies) Last day to drop or withdraw with academic penalty; the student must be passing the course at the time of the requested drop in order to receive a Q. The drop form, including all required signatures, must arrive in the Records Office by no later than 4:00 PM. No drop is allowed after this date except in extreme extenuating circumstances. Any "late drop" must be approved by the instructor, department chair, college dean, and provost.

Academic Integrity: Students are expected to maintain complete honesty and integrity in their academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. Students are specifically warned against all forms of cheating and plagiarism. The *Lamar University Student Handbook* clearly reads:

“Any student found guilty of academic dishonesty in any phase of academic work will be subjected to disciplinary action. Punishable offenses include, but are not limited to, cheating on an examination or academic work which is to be submitted, plagiarism, collusion, and the abuse of source materials.” One aspect of the *Handbook*’s definition of cheating includes “purchasing or otherwise acquiring and submitting as one’s own work any research paper or other writing assignment prepared by an individual or firm.” Plagiarism is defined as “the appropriation and the unacknowledged incorporation of another’s work or ideas into one’s own and submitted for credit.” Faculty members in the College of arts and Sciences investigate all cases of suspected plagiarism. Any student who is found cheating in this course will receive a course grade of F.

<http://dept.lamar.edu/studentaffairs/handbook.htm>

Accommodations: Lamar University is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is located in the Communications Building Room 105. Office staff collaborate with students who have disabilities to provide and/or arrange reasonable accommodations. If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact the DRC at [409-880-8347](tel:409-880-8347) or drc@lamar.edu to arrange a confidential appointment with the Director of the DRC to explore possible options regarding equitable access and reasonable accommodations. If you are registered with DRC and have a current letter requesting reasonable accommodations, we encourage you to contact your instructor early in the semester to review how the accommodations will be applied in the course.

Campus Closure: In the event of an announced campus closure in excess of four days due to a hurricane or other disaster, students are expected to login to Lamar University's website's homepage (www.lamar.edu) for instructions about continuing courses remotely.

Emergency Procedures: Many types of emergencies can occur on campus; instructions for severe weather or violence/active shooter, fire, or chemical release can be found at:

<http://www.lamar.edu/about-lu/administration/risk-management/index.html>.

Following are procedures for the first two:

Severe Weather:

- Follow the directions of the instructor or emergency personnel.
- Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.
- If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building.
- Stay in the center of the room, away from exterior walls, windows, and doors.

Violence/Active Shooter:

- **CALL** - 8-3-1-1 from a campus phone (880-8311 from a cell phone). Note: Calling 9-1-1 from either a campus phone or cell phone will contact Beaumont City Police Dispatch rather than University Police.
- **AVOID** - If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.

- **DENY** - Barricade the door with desks, chairs, bookcases or any other items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.
- **DEFEND** - Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.

Course Evaluations: You will have an opportunity to evaluate all aspects of this course in a formal process to be completed online near the end of the term. You will receive an email reminder through your LU account.

While I have made a sincere effort to ensure that this syllabus is correct, changes may be required. I will announce any substantive changes during a regularly scheduled class. If you find an error or omission, please advise me at once so that the other members of the class may be advised.

Sections, Topics, and Suggested Problems:

<u>Section</u>	<u>Topic</u>	<u>Page/Problems</u>
1.1	Populations, Samples, and Processes	12/1,3,4
1.3	Measures of Location	34/33,38,41,42
1.4	Measures of Variability	44/44,45,47
2.1	Sample Spaces and Events	56/1,3,4,5
2.2	Axioms, Interpretations, and Properties of Probability	64/11,14,16,18,21
2.3	Counting Techniques	73/29,31,33,37,39
2.4	Conditional Probability	82/45,47,49,51
2.5	Independence	89/70,71,77,78,80
3.1	Random Variables (R.V.)	98/1,4,6,7a,c,e,g
3.2	Probability Distributions for Discrete R.V.	107/11,13,14,17,18,19
3.3	Expected Values	116/29,30,34,38,39
3.4	The Binomial Probability Distribution	123/47a,c,e,g,49,53,55,57
3.5	Hypergeometric and Negative Binomial Distributions	130/68,69,71,72
3.6	The Poisson Probability Distribution	135/79,81,83,85
4.1	Probability Density Functions	146/1,3,5,7
4.2	Cumulative Distribution Functions and Expected Values	154/11,13,14
4.3	The Normal Distribution	167/28a,c,e,g,i,29,35,37,39,43
4.4*	The Exponential and Gamma Distributions	175/59,61,67
5.1	Jointly Distributed R.V.	210/1,5,9
5.2	Expected Values, Covariance, and Correlation	219/22,25
5.3	Statistics and Their Distributions	229/37,39,41
5.4	The Distribution of the Sample Mean	236/46,47,49,53
5.5	The Distribution of a Linear Combination	241/58,59,60,65
6.1	Some General Concepts of Point Estimation	261/1,2,3
6.2	Methods of Point Estimation	273/20,23,25
7.1	Basic Properties of Confidence Intervals (C.I.)	284/1a,c,3,5
7.2	Large-Sample C.I. for a Population Mean and Proportion	292/13,15a,c,17,21,23
7.3	Intervals Based on a Normal Population Distribution	302/28a,c,29a,c,e,33,37
7.4*	C.I. for the Variance and Standard Deviation of a Normal Population	306/42a,c,e,43a,c,45,47
8.1	Hypotheses and Test Procedures	325/1a,c,e,2a,c,e,g,3,5,7,9a,c,e,11a,c,e
8.2	z-Tests About a Population Mean	333/15,17,19,20
8.3	The One-Sample <i>t</i> -Test	344/29a,c,31a,c,37
8.4	Tests Concerning a Population Proportion	350/42a,c,,43,45

9.1	z-Test and C.I. for a Difference between Two Means
9.2	The Two-Sample t -Test and C.I.

371/1,8
379/17a,c,19,23,29

• = optional

Revised: 8/15/2017, P.C.