MATH 3342: Mathematical Statistics for Engineers and Scientists
Section H01 Spring 2018

Instructor: Dr. Leif Ellingson
E-Mail: leif.ellingson@ttu.edu Office: MATH 215
Office Hours: TuTh 2 PM—3:20 PM Additional times available by appointment.

Class Meetings: 11:00 – 12:20 TuTh in MATH 110
Final Exam: Saturday, May 12 1:30 PM – 4:00 PM

Textbook: *Probability & Statistics for Engineering and the Sciences*, 9th Edition, by Jay L. Devore
Calculator: A graphing calculator (ie. TI-83+, TI-84, or TI-86) is *strongly* recommended, but not required. You must have at least a scientific calculator.
Cell phones and PDAs may NOT be used as calculators!
NO sharing of calculators during exams! Doing so will result in a 0.
Prerequisites: MATH 2450

Course Purpose

This course is designed to cover topics from mathematical statistics that are of interest to students from engineering and/or the sciences. Topics should include descriptive statistics, elementary probability, random variables and distributions, mean variance, parameter estimation, hypothesis testing, (time permitting) regression, and analysis of variance.

Expected Student Learning Outcomes

Students will apply their calculus knowledge to learn the meanings of, and computational procedures relating to, basic statistical concepts used for making decisions in the sciences and engineering. In particular, students will:

1. Understand the need to be wary of statistical claims, common pitfalls in sampling, and misrepresentation of conclusions.
2. Understand the meanings of various statistical measures, including the mean, median, mode, standard deviation, variance, and quartiles.
3. Become familiar with various graphical representations of data and learn to recognize misleading graphs.
4. Develop proficiency in real-world probability problems.
5. Understand the concept of a probability distribution and real-world problems involving various distributions, such as binomial, normal, hypergeometric, and Poisson distributions.
6. Understand and apply the Central Limit Theorem.
7. Compute and interpret confidence intervals.
8. Conduct and interpret hypothesis tests.

Methods of Assessing the Expected Learning Outcomes

Continuous formative assessment of the progress of the course will occur via ongoing communication between the instructor and the students. Students are encouraged to ask questions during class and to seek the instructor's help outside class. The expected learning outcomes for the course will be assessed through 2 midterm exams, quizzes, and a cumulative final exam.

Grades

Point totals will be rounded to the nearest whole number. The letter grade assignment percentages are strictly enforced. For example, a final percentage of 79.4 will be rounded to 79 and the grade will be a C.

A	90—100
B	80—89
C	70—79
D	60—69
F	0—59

Your numerical grade will be calculated using three formulas. The highest of these three scores will be used to determine your final letter grade:

$$Score\ 1 = \ 0.30(Exam\ 1) + 0.30(Exam\ 2) + 0.10(Quizzes) + 0.30(Final)$$

$$Score\ 2 = \ 0.15(Lower\ Midterm) + 0.30(Higher\ Midterm) + 0.15(Quizzes) + 0.40(Final)$$

$$Score\ 3 = \ 0.25(Exam\ 1) + 0.25(Exam\ 2) + 0.50(Final)$$

Attendance

Attendance will not be taken. However, students are expected to attend all lectures, with the exception of excused absences. Students are responsible for *all* material presented and announcements made during class. Announcements for the exact dates of exams will be announced **in-class** so it is the responsibility of the student to know when assignments will be and to be prepared for them. In addition, there ***may*** occasionally be in-class assignments that count as extra credit** that require attendance. These assignments may or may not be announced in advance.

**The extra credit will be counted as part of the score for the exam covering that material.

Quizzes

Brief in-class quizzes will be given regularly throughout the semester. The questions will greatly reflect homework questions from recently covered material. These will be open-book and open-note and are to be completed **individually**. They will reflect homework questions, so only a limited amount of time will be given for them. Calculators may be used. Only the top 75% of your quiz scores will be counted towards your grade.

Exams

A total of two midterm exams will be given throughout the semester. While they are unit exams, the material in this course is often cumulative by nature. These two exams will be given during regularly scheduled lectures. The Final Exam will be given during the allotted period of the final examination week. The Final Exam is cumulative, though it may have a greater focus on material taught after Midterm Exam 2.

The exams will be **closed**-book and **closed**-note and are to be completed **individually**. However, *one* 8.5" x 11" handwritten note/formula sheet (no photocopies or computer-generated output) with writing on both sides will be permitted for use. This formula sheet may contain only definitions and formulas and ***must*** be turned in in with your exam.

While you are strongly encouraged to have a graphing calculator with you for exams, it does not suffice to simply provide calculator output for your answers. Your work to arrive at your answer is just as important as the answer you arrive at, if not more so. Accordingly, unless otherwise stated, you are expected to provide work and/or provide reasoning for you answer. This shows that you understand how to solve the problem as well as leaving open the opportunity to receive partial credit.

Homework

Practice problems for each section covered in lecture are listed on the website for this class. It is the responsibility of the student to remain current. These problems will not be collected, but similar problems may appear on quizzes and exams. In addition to the completion of both types of problems, students are also expected to **read** the chapters in the textbook that correspond to the material covered in lecture.

Make-Ups

Make-up *exams* will be available in the case of **excused** absences. If you know of an absence in advance, please let me know so that the make-up exam can be given in advance. Otherwise, the make-up exam must be taken within **one week of the day the in-class** exam. Therefore, it is critical that you be aware of exam dates and of any conflicts that may arise and schedule a time to complete the work. Once an appointment has been set to make-up an assignment, the agreed upon time will be viewed as though it is class, so **missing the make-up without an excused absence will be considered the same as missing class, resulting in a score of 0**.

Make-up *quizzes* will be available only for excused absences in which the student notifies the instructor of the absence ahead of time. These make-up assignments must be completed within **one week** of the date of the excused absence or else a **score of zero will be given**.

In most cases, it is up to the discretion of the instructor what will constitute an excused absence, though they will be granted for emergencies, such as a death in the family, or treatment of an injury or illness at a medical facility. They ***will*** also be granted for

absences related to University-affiliated groups, such as trips for recognized student organizations and participation in University-affiliated athletic competitions. In such cases, please inform the instructor ahead of time. **In most cases, documentation is required**. Finally, excused absences will be granted for observance of Religious Holidays according to the official TTU policies described below:

Absences due to Religious Observance

"Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code §11.20. A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. A student who is excused may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.

Absences due to Officially Approved Trips

The Texas Tech University Catalog states that the person responsible for a student missing class due to a trip should notify the instructor of the departure and return schedule in advance of the trip. The student may not be penalized and responsible for the material missed. Students absent because of university business will be given the same privileges as other students.

Grade Appeals

A written statement of the grade appeals must be provided within **one week** of the assignment being returned ***to the class***. Give the instructor your work in question and a clear, brief explanation of why you think you deserve additional credit.

Tentative Course Outline

A ***tentative*** outline for the course is provided on the final page of this syllabus. While the general progression of the material should remain the same, the dates on which content is covered and exams are given are subject to change. As such, **it is the responsibility of the student to know the final dates of exams by attending class**.

E-Mail Considerations

Please adhere to the following guidelines when emailing your instructor:
1. E-mail is to be from the TTU domain.
2. E-mail will not contain unexpected attachments.
3. The course number is clearly indicated in the message.

Classroom Civility

The lecture experience will be greatly enhanced if all students will (1) be prepared for the lecture by reading assigned sections in the text, (2) refrain from talking to your neighbors unless instructed to do so, (3) arrive promptly before the start of class, (4) turn off audible cell phone and pager signals, (5) avoid using cell phones or other wireless devices during lecture, (6) avoid reading a newspaper during lecture, and (7) participate; ask questions whenever they occur to you.

Help Outside of Class

1. **Me**: Please feel free to ask questions during my office hours, by appointment, or by e-mail. My office hours are not to be used as a substitute for regular class attendance.
2. **Your Classmates**: Talk to other students in the class to see if they can help you.
3. **The Mathematics and Statistics Tutoring and Study Center**: The Department of Mathematics and Statistics provides a **free** tutoring service in MATH 106. The tutors will do their best to help you sort out your difficulties. If you use this service, please have specific questions picked out and bring your textbook/notes with you. The help room staffers are not your instructors and the help room should not be used as a substitute for class attendance. For more information, please see http://www.math.ttu.edu/Undergraduate/Resources/TSC/tutor.shtml.
4. **The Learning Center**: For more information on this service, please see http://www.depts.ttu.edu/soar/LC/Index.php.
5. **Private Tutors**: You may hire a tutor. The Department of Mathematics and Statistics has a list of tutors. Contact anyone on that list who mentions willingness to tutor this specific course to inquire about using their services. For more information, please see http://www.math.ttu.edu/Undergraduate/Resources/TSC/privatetutors.shtml .

Course Website

The website for this course is located at http://www.math.ttu.edu/~lellings/3342/ . Course materials, including the list of suggested homework problems, tables, and powerpoint slides in pdf form, will be posted to the website. These materials are intended solely as a ***supplement*** to regular class attendance, not as a substitute.

Students with Disabilities

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note: instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact Student Disability Services in West Hall or call 806-742-2405.

Academic Integrity

Is assumed and expected at all times. Students are advised to acquaint themselves with the Code of Student Conduct.

It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.
"Scholastic dishonesty" includes, but it not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

Except for changes that substantially affect grading, this syllabus is intended as a guide and is subject to change with advance notice.

Tentative Schedule

(as of start of semester)

January	18	Introduction, 1.1
	23	1.2 (Mostly on your own), 1.3
	25	1.3, 1.4
	30	1.4, 2.1, 2.2
February	1	2.2, 2.3
	6	2.3, 2.4, 2.5
	8	2.4, 2.5
	13	3.1, 3.2
	15	3.2
	20	3.3, 3.4
	22	3.4, 4.1
	27	4.1, 4.2
March	1	4.2, 4.3
	6	4.3, REVIEW
	8	**EXAM 1**
	13-15	**NO CLASS — SPRING BREAK**
	20	5.3, 5.4
	22	5.4, 6.1
	27	6.1, 7.1
	29	7.1, 7.2
April	3	7.2, 7.3
	5	7.3, 8.1
	10	8.1, 8.2
	12	8.2, 8.3
	17	8.3, 8.4
	19	8.4, 9.1
	24	9.1, 9.2
	26	**EXAM 2**
May	1	9.2, 9.3
	3	9.3, 9.4
	8	9.4, REVIEW
	12	**FINAL EXAM 1:30 PM – 4:00 PM**