

AAEC 2401-002 Agricultural Statistics

Fall 2021

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Classrooms & Timings:

Location: Agriculture Sciences Room 208
Time: Tuesday and Thursday 8.00 AM to 9.20 Am (Face to face)
Lab (Online): Wednesday 2.00 PM to 4.50 PM (Agricultural Sciences Lab room)

Office Hours: 9.30-10.30 AM TT or by appointment

Text:

Fundamentals of Statistics: Informed decisions using data & MML Gen & MyStat Pkg by Michael Sullivan, III. 5th edition, Pearson Prentice Hall.

The following link for Pearson MyLab Student Registration and Sign-in for purchasing online textbook and lab access:

<https://support.pearson.com/getsupport/s/article/MyLab-Mastering-for-Blackboard-Learn-Student-Registration-and-Sign-In>

Please register at Pearson within first 2 weeks of the class.

Prerequisites:

College algebra or higher math.

Course Description:

Principles and procedures in the analysis of agricultural data including indices of central tendency and dispersion; probability; sampling; significance tests; analysis of variance; and correlation and simple linear regression.

Course Purpose:

Statistics is the science of collecting, organizing, summarizing, and analyzing information in order to draw conclusions (from *Fundamentals of Statistics* by Michael Sullivan). Statistics is a discipline that plays a major role in many different areas. For example, statistical analysis is used in sports to help team management make informed decisions about their competition. Statistics is used to predict the outcome of political elections and to aid in determination of government policies. Statistics assists in determining the effectiveness of new medications. Agronomists employ statistical analysis to discover higher yielding crop varieties. Animal scientists use statistics to find new feeding regimes for animals. Statistics plays a major role in economics in testing hypotheses about economic relations. Statistical models are used to predict economic output, interest rates, stock and commodity prices, and other economic variables.

Used appropriately, statistics can help us understand the world we live in. Used inappropriately, statistics can lend support to inaccurate beliefs and understanding. Understanding the methods

and procedures of statistics will equip the student with knowledge to appreciate and critique studies and experiments. With this ability, the student will be an informed consumer of information, which will enable differentiation of solid statistical analyses from the sterile presentation of numerical facts.

AAEC 2401 is a required course for all degree programs in the Agricultural & Applied Economics Department. The course is listed under the “Mathematics” component of the University Core Curriculum, with the objective “to develop a quantitatively literate college graduate.” AAEC 2401 is a prerequisite for AAEC 4302, Statistical Methods in Agricultural Research.

Expected Learning Outcomes:

By the end of this course, students will be able to:

- Organize and interpret data using graphs and tables and identify and explain important features of a dataset.
- Calculate measures of central tendency and dispersion (e.g., mean and standard deviation) and use these measures to explain important features of a dataset.
- Compute and interpret probabilities for discrete and continuous random variables.
- Explain the concept of a sampling distribution and calculate the mean and standard deviation of the sampling distribution of the mean.
- Explain the Central Limit Theorem.
- Test hypotheses about means and proportions (for one and two populations) and interpret the statistical conclusion in the context of the problem.
- Calculate and interpret confidence intervals for means and proportions for one and two populations.
- Calculate an analysis of variance and means-separation and interpret the results.
- Estimate a linear relation between two variables, interpret the relation, and use it to predict.
- Measure quantitatively the relation between two variables and test a hypothesis about the relation and interpret the conclusion.
- Apply chi-square tests (goodness-of-fit, independence, and homogeneity of proportions) and interpret the results.
- Apply statistical techniques to solve practical statistical problems.

The items above require the use of arithmetic computation, algebraic formulas, and statistical/logical reasoning. In this course, students will be required to apply statistical techniques they learn in the course to answer real-world statistical problems. Students will practice reading the narrative about a statistical problem, and then express the statistical problem in terms of a statistical hypothesis (using a mathematical formula). Next, they will identify an appropriate statistical technique (from a variety of techniques) to test the hypothesis, and finally they will draw a statistical conclusion from the statistical test and prepare a practical (written) interpretation of the conclusion.

Methods for Assessing the Expected Learning Outcomes:

Assessment of the expected learning outcomes will be measured using quizzes, tests, exams, and discussions on individual topics.

Tests and Exam

Three tests plus a final exam will be given during the semester. Tests and exam questions will require hand calculations, and explanations of the problem results will require long and short written answers. We will use problems from Pearson for tests and labs.

Lab Assignments

Students are required to work on a 3-hour long lab session once a week where they solve computer-generated problems. Lab assignments will be available on *CourseCompass* /*MyMathLab* (computer software available with the class textbook) a few days prior to the submission date. Lab assignments allow students to develop understanding of statistical concepts by solving statistical problems using active learning. The statistical theory required to solve lab problems will be presented during lectures. Because each statistical problem is unique having a different context, different data, and a different write-up, application of statistics to real-world problems will demonstrate critical thinking skills, analysis, creativity, use of visualization (graphs) and written expression to communicate and interpret the results.

This semester due to COVID to minimize exposure to the virus labs will be on-line. If you have questions related to one of our labs, you may attend Zoom meetings, which will take place during lab hours. Instructor Israt Jahan will be at the lab during the lab hours.

Quizzes

Quizzes will be given once a week. All quizzes and tests will be given on Friday, in real time, using Blackboard and Pearson.

Take-Home Assignments—Take-home assignments will be assigned on two to four selected topics during the semester. They will require extensive use of technology (word processing and spreadsheet application software -Excel) to create tables, graphs, and written answers to questions. The assignments will require mathematical calculations, interpretation, and evaluation of mathematical formulas, and written and visual expression to explain the results.

Muddiest-Point Activities and Polling the Class—When covering difficult sections of the course, students will be polled to report concepts/problems that are confusing or unclear. Supplemental exercises will be created to help clarify the muddiest-point issues.

Class Content and Tentative Schedule:

| Week | Text Material | E-book Material |
|------|---|--|
| 1 | Chapter 1.1-1.5, and Chapter 2.1-2.2 | |
| 2 | Chapter 2.3 Chapter 3.1-3.2 | Chapter 2.3 Additional Displays of Quantitative Data |
| 3 | Chapter 3.3-3.5 Chapter 4.1 | |
| | Test #1. Date will be announced in class and Blackboard 10 days before the test. | |
| 4 | Chapter 4.2-4.3 | |
| 5 | Chapter 5.1 and Chapter 6.1 | |
| 6 | Chapter 7.1-7.4 | |
| 7 | Chapter 8.1 | |
| | Test #2. Date will be announced in class and Blackboard 10 days before the test. | |
| 8 | Chapter 8.2 and Chapter 9.1 | |
| 9 | Chapter 9.2-9.3 and Chapter 10.1 | |
| 10 | Chapter 10.2-10.4 | |
| 11 | Chapter 11.1 | |
| | Test #3. Date will be announced in class and Blackboard 10 days before the test. | |
| 12 | Chapter 11.2-11.3 and Chapter 12.3 | |
| 13 | | Appendix B : Additional Topics can be found in Sullivan's eBook using the following link: www.pearsonhighered.com/sullivanstats |
| 14 | Chapter 12.1-12.2 | |

To access additional materials for AAEC2401 click on the following link:
www.depts.ttu.edu/aec/people/murova.php

Final Exam: Final exam will take place on Wednesday, December 8, 7:30 a.m. to 10:00 a.m.

Grading:

Your grade will consist of three tests (100 points x 3 = 300 points total), labs (each lab is worth 12 points x 12 labs, total is 144 points), quizzes and homework (out of 120 points, sum of all Qs & HW), and a final exam (100 points). The lab grades will be sum of all computer-generated lab grades in Pearson. The final exam is optional and can replace your lowest test score.

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|--------------------|---------------------------------|------------|
| Exam 1 | | 100 points |
| Exam 2 | | 100 points |
| Exam 3 | | 100 points |
| Quizzes + homework | 10 x 12 points each HW or lab = | 120 points |
| Labs | 12 x 12 points each lab = | 144 points |
| | Total: | 564 points |

The minimum percentage required to achieve a given letter grade will be:

A=90%

B=80%

C=70%

D=60%

F= lower than 60%

<https://www.youtube.com/watch?v=ifOatldIzs&feature=youtu.be>

If Texas Tech University campus operations are required to change because of health concerns related to the COVID-19 pandemic, it is possible that this course will move to a fully online delivery format. Should that be necessary, students will be advised of technical and/or equipment requirements, including remote proctoring software.

COVID-19 pandemic expectations to follow when attending classes:

- Face coverings are required.** Students are expected to enter the building wearing a face covering and keep it on throughout the class period and when walking through the building afterward. There are masks available at the designated areas of Agriculture building if you need one. There is sanitization station on this floor that you may use any time. Remember - **No Mask, No Class**.
- Signage.** Pay attention and learn signage posted at external and some classroom doorways that indicates entry and exit ways, gathering and queuing spaces, and availability of masks and hand sanitizer.
- Seating assignments.** Students are expected to sit at a minimum of six feet apart. This classroom has marking of unavailable seats. A required seating chart will be created once everyone is positioned with appropriate social distancing. The purpose of assigned seating is to assist in contact tracing. In a hybrid course with alternating attendance days, a seating chart will be made for each group of students meeting face-to-face. There will also be an orderly procedure, designed to ensure social distancing, for exiting the classroom. Students will enter classroom one by one, occupying the last row first, then one row at a time towards the front row. When dismissed, the first row leaves first and then the consecutive ones, keeping face coverings on and maintaining social distancing.
- In the event a class member has a positive case.** If at any time during this semester you feel ill, in the interest of your own health and safety as well as the health and safety of your instructors and classmates, you are encouraged *not* to attend face-to-face class meetings or events.

If you are ill and think the symptoms might be COVID-19-related:

- Call Student Health Services at 806.743.2848 or your health care provider. After hours and on weekends contact TTU COVID-19 Helpline at [TBA].
- Self-report as soon as possible using the [Dean of Students COVID-19 webpage](#). This website has specific directions about how to upload documentation from a medical provider and what will happen if your illness renders you unable to participate in classes for more than one week.

- iii. If your illness is determined to be COVID-19-related, all remaining documentation and communication will be handled through the Office of the Dean of Students, including notification of your instructors of the period of time you may be absent from and may return to classes.

If you are ill and can attribute your symptoms to something other than COVID-19:

- iv. If your illness renders you unable to attend face-to-face classes, participate in synchronous online classes, or miss specified assignment due dates in asynchronous online classes, you are encouraged to visit with either Student Health Services at 806.743.2848 or your health care provider. Note that Student Health Services and your own and other health care providers may arrange virtual visits.
- v. During the health provider visit, request a “return to school” note;
- vi. -mail the instructor a picture of that note;
- vii. Return to class by the next class period after the date indicated on your note.

You will still be responsible to complete within a week of returning to class any assignments, quizzes, or exams you miss because of illness.

Department of Agricultural & Applied Economics - Classroom Rules and Behavior

Students are expected to show respect to classmates, instructors, and especially guest speakers. Consistent with the stated assumptions and beliefs of Texas Tech University, the department has composed and the AAEC Student Association has endorsed the following set of rules for appropriate student classroom behavior.

- Do not talk during class meetings. Talking is disruptive to the instructor and to your fellow classmates.
- Do not arrive late to class and do not leave the classroom during class meetings. Exceptions may occur for medical emergency, physiological urgency or situations where prior instructor approval has been granted.
- Do not use (including viewing of) communication devices (phones, etc) during class meetings. All electronic devices should be silenced during class meetings.
- Do not read/view other unassigned materials (newspapers, magazines, etc) during class meetings.
- Do not exhibit disruptive posture during class meetings. e.g. sleeping, slouching, laying, resting feet/head on furniture, etc.
- Do not use notebook computers during class meetings unless prior instructor approval has been granted.
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As stated above, these guidelines should be followed in every AAEC class meeting, and represent the minimum level of respect expected from students.

Absence due to religious observance—A student who is absent from classes for the observance of a religious holy day will be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence (*University Catalog*). Notification must be made in writing and delivered in person no later than the 15th class day of the semester.

Absence due to officially approved trips—A student who is absent due to an official trip should obtain a letter to that effect from the person responsible for the student missing class. The student will not be penalized and is responsible for the material missed (*University Catalog*).

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, you may contact the Student Disability Services office in 335 West Hall or 806-742-2405.