AG 505.01W – STATISTICAL METHODS IN AGRICULTURE
COLLEGE OF AGRICULTURAL SCIENCES AND NATURAL RESOURCES
FALL 2024

COURSE SYLLABUS

Instructor
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Class Time
Web Based Course (myleoonline.tamuc.edu)

Office Hours
For immediate consultation, I will be available in my office Tuesdays and Wednesdays from 10:00 a.m. – 12:30 p.m. (noon) or by appointment. If I am unable to meet with you at that time, send me an email and we will schedule an appointment. The best way to contact me is via email at Jose.Lopez@tamuc.edu. You can also email me from D2L (myleoonline.tamuc.edu). I generally answer emails within 48 hours. Students who email me after 5:00 PM can expect to receive a reply within 48 hours starting at 8:00 am of the next business day (M-F). Students who email me during holidays or over the weekend should expect a reply within 48 hours from 8:00 AM of the next regularly scheduled business day.

COURSE INFORMATION

Required Text
Statistics: Informed Decisions Using Data, by Michael Sullivan, Prentice-Hall, Inc., New York, 5th Edition, 2016. (ISBN-13: 9780134133539 or ISBN-10: 0134133536)

Note: Older editions of the textbook such as 4th or 3rd edition are also acceptable; however, the section numbering may not match. Students who decide to purchase older editions of the textbook are responsible for matching the section numbering provided in the course calendar (refer to Course Calendar at the end of this syllabus) with the section numbering in their textbook.

Required Software
Microsoft Excel 2010 or newer version. Note: Older versions will work fine but procedures may not be the same as in Excel 2010 or in a newer version. The student will be responsible for figuring out the steps and procedures if using an older version than Excel 2010.

Microsoft Excel is available in the computers at the Library and our Computer Lab (Room AGIT 148) in the Agriculture Building on campus.

Our university also provides access to **online only** versions of Microsoft Word, PowerPoint, and Excel.

Additional information available at:
https://inside.tamuc.edu/facultystaffservices/academictechnology/student-resources.aspx

The instructions on how to create a student account with your Leomail address are available at:
https://inside.tamuc.edu/facultystaffservices/academictechnology/_documents/Office-365-Students.pdf

If you have technical questions, you can contact our Center for Information Technology Excellence (CITE). Their contact information is available at:
http://inside.tamuc.edu/campuslife/campusServices/CITESupportCenter/contactus.aspx

Prerequisites
None.

Teaching Philosophy
1. A course must deliver information, concepts and methods that will be useful in the student's professional life. However, learning analytical reasoning skills and improving the ability to process and use information efficiently is more important than memorizing facts and formulas and performing procedures repeatedly.
2. Students learn best when theories, concepts and procedures are explained in plain language as well as formally, and are complemented with examples or applications that are relevant to the students.

Character Formation
It is important during your graduate education to learn the values and rewards of hard work, responsibility, and honesty. The professor will promote character formation while teaching the course.

Course Description
Discussion of descriptive statistics, probability distributions, inference, and regression analysis.

Student Learning Outcomes
Upon satisfactory completion of the course the students will be able:
- To compute measures of central tendency and dispersion, and use them to analyze and summarize datasets.
- To compute and measure the correlation between two agricultural variables and explain the difference between correlation and causation.
- To estimate least-squares regression models.
- To understand different probability distributions, including their relationships and characteristics.
- To conduct hypothesis tests (t tests, and z tests) using one sample.

- - To determine null and alternative hypotheses, explain Type I and Type II errors, and state conclusions to hypothesis tests for population mean with known or unknown population standard deviation and for a population proportion.
- To conduct hypothesis tests (*t* tests, and *z* tests) using two samples.
  - To determine null and alternative hypotheses, explain Type I and Type II errors, and state conclusions to hypothesis tests for two means when samples are dependent, two means when samples are independent, and two population proportions.
- To conduct hypothesis tests regarding a probability distribution, hypothesis tests regarding two categorical variables from one population (chi-square test for independence), and hypothesis tests regarding two or more populations for one categorical variable (chi-square test for homogeneity of proportions).
- To conduct hypothesis tests for three or more means using one-way analysis of variance (one-way ANOVA).
  - To determine null and alternative hypotheses, explain Type I and Type II errors, and state conclusions to hypothesis tests for three or more means
- To conduct post hoc tests on one-way ANOVA using Tukey test.
  - To summarize the conclusions of Tukey test

Topics
Part I: Descriptive Statistics
- **Topic 1: Numerically Summarizing Data**
  - Measures of Central Tendency
    - Discussion, computation, and interpretation of measures of central tendency (mean, media, and mode) and the relationships between them; explanation of resistance.
  - Measures of Dispersion
    - Discussion, computation, and interpretation of measures of dispersion (range, variance, and standard deviation) and the relationships between them; use of the empirical rule to describe data that are bell shaped (percent of observations lying within one two, and three standard deviation from the mean).
  - Measures of Position and Outliers
    - Explanation of measures of positions (the z-score, the percentile, the interquartile, the interquartile range, and outliers); computation and interpretation z-scores, percentiles, quartiles, and interquartile range; checks for outliers.
- **Topic 2: Describing the Relation between Two Variables**
  - Pearson product moment correlation coefficient
    - Properties, computation, and interpretation of the linear correlation coefficient; discussion of confounding and lurking variables.
  - Least-Squares Regression and Diagnostics
    - The model, specification, estimation, regression coefficients, interpretation, regression statistics, measures of fit, multicollinearity.

Part II: Probability Distributions
- **Topic 3: Probability Distributions**
  - Normal distribution
  - Standard Normal Distribution

- o Chi-Square Distribution
- o The F-Distribution

Part III: Inference
- **Topic 4: Hypothesis Tests Regarding a Parameter**
  - o The Language of Hypothesis Testing
    - Determination of the null and alternative hypothesis; explanation of Type I and Type II errors; and stating conclusions to hypothesis testing.
  - o Hypothesis Tests for a Population Mean – Population Standard Deviation Known
    - Hypothesis testing about a population mean with standard deviation known using the classical approach, using P-values, and using confidence intervals with small and large samples; consideration one and two tail tests; discussion of statistical significance and practical significance.
  - o Hypothesis Tests for a Population Mean – Population Standard Deviation unknown
    - Hypothesis testing about a population mean with standard deviation unknown using the classical approach, using P-values, and using confidence intervals with small and large samples; consideration of one and two tail tests.
  - o Hypothesis Tests for a Population Proportion
    - Hypothesis testing about a population proportion with small and large samples; consideration of one and two tail tests.
- **Topic 5: Inference on Two Samples**
  - o Inference about two means: dependent samples
    - Hypothesis testing regarding the difference of two dependent means using the classical approach, using P-values, and using confidence intervals. Discussion of matched-pairs data and hypothesis test requirements.
  - o Inference about two means: independent samples
    - Hypothesis testing regarding the difference of two independent means using the classical approach, using P-values, and using confidence intervals. Discussion of completely randomized designs, hypothesis test requirements, equal and unequal population standard deviations, Welch's approximate t, and pooled two-sample t-tests.
  - o Inference about population proportions
    - Hypothesis testing regarding the two population proportions from independent samples using the classical approach, using P-values, and using confidence intervals. Discussion of completely randomized designs, hypothesis test requirements, the pooled estimate of p, sample size necessary for estimating the difference between two population proportions.
    - Hypothesis testing regarding the two population proportions from dependent samples using the classical approach, using P-values, and using confidence intervals. Discussion of matched-pairs data, hypothesis test requirements, McNemar's test, contingency tables, sample size necessary for estimating the difference between two population proportions.
  - o Inference for two population standard deviations
- **Topic 6: Inference on Categorical data**
  - o Goodness-of-Fit Test

- Hypothesis tests regarding a probability distribution. Discussion of the chi-square distribution, mutually exclusive outcomes, expected counts, hypothesis test requirements, chi-square test statistic, chi-square critical values, and stating conclusions.
  - Test for independence and the homogeneity of proportions
    - Hypothesis tests regarding two categorical variables from one population (chi-square test for independence). Discussion of expected counts, hypothesis test requirements, contingency tables, chi-square test statistic, chi-square critical values, calculation of p-values, and stating conclusions.
    - Hypothesis tests regarding two or more populations for one categorical variable (chi-square test for homogeneity of proportions). Discussion of expected counts, hypothesis test requirements, contingency tables, chi-square test statistic, chi-square critical values, calculation of p-values, and stating conclusions.
- **Topic 7: Compering three or more means**
  - One-way analysis of variance
    - Hypothesis testing regarding three or more means using one-way ANOVA. Discussion of hypothesis test requirements, between-sample variability versus within sample variability, mean square due to treatments, mean square due to error, F-test statistic, ANOVA tables, F-critical values, calculation of p-values, and stating conclusions.
  - Tukey Test
  - The randomized complete block design
  - Two-way analysis of variance
    - Hypothesis testing regarding two-way ANOVA.

GRADING

Grading

Item	Percentage
Exams 1-3	75.00%
Quizzes	10.00%
Labs	15.00%
	100.00%

Note: There would be an optional final comprehensive exam (Exam 4). The lowest Exam 1-4 grade will be dropped. If you decide not to take Exam 4, that is the one that will be dropped. All your grades will be available in MyLeoOnline (D2L), the learning management system used by Texas A&M University-Commerce.

Grading Scale

Range	Grade
90-100.00	A
80-89.99	B
70-79.99	C
60-69.99	D
Less than 60	F

Exams
Students will take exams online in the course website. Make sure you take all the mandatory exams (see Course Calendar below). No makeup exams will be offered. A grade of zero will be assigned to any missed mandatory exams. Exams and quizzes will be administered through MyLeoOnline (D2L). Exams will be timed and are to be completed by 11:59 PM on the due date. Make sure you have internet access and a laptop battery fully charged (if using a laptop computer). See also course website (MyLeoOnline) for dates.

Quizzes
Quizzes will be graded and should be considered very important course material for your exam preparation. Students will be required to submit their individual answers via MyLeoOnline according to the course calendar provided (see Course Calendar below). Quizzes are due at 11:59 PM on the date provided in the Course Calendar below. See also course website (MyLeoOnline) for dates.

Labs
Labs will be graded and will test your understanding of the applications of statistics to situations you may encounter in your professional career. In the Labs, you will learn to use Microsoft Excel to solve practical problems and make informed decisions using data. Students will be required to submit their individual answers via MyLeoOnline according to the course calendar provided (see Course Calendar below). Labs are due at 11:59 PM on the date provided in the Course Calendar below. See also course website (MyLeoOnline) for dates.

Review Questions
Review Questions will NOT be graded. Students are welcome to ask questions during office hours. Review Questions are designed to help you understand and/or highlight the material you should understand after you complete a module. The students are NOT required to submit their answers to the Review Questions.

Practice Questions
Practice Questions will NOT be graded. Students are welcome to ask questions during office hours. Practice Questions will be selected from the textbook. Practice Questions are provided for those students who wish to practice additional questions than the ones provided in each of the section Exercises (refer to Exercises section above). The students are NOT required to submit their answers to the Practice Questions.

Class Preparation and Attendance
It is your responsibility to read and study the book chapters that will be covered, to read and study all handouts, to complete and submit all course assignments in-time, and to take all the mandatory exams before the deadline. Students are strongly encouraged to contact the instructor if they have any questions or comments.

TECHNOLOGY REQUIREMENTS

This course will be offered online using D2L, the learning management system used by Texas A&M University-Commerce. Students will be required to download PDF Handouts of the

PowerPoint presentations and other important class material from the D2L website for the course.

<div align="center">**LMS**</div>

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:
https://community.brightspace.com/s/article/Brightspace-Platform-Requirements

LMS Browser Support:
https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

Zoom Video Conferencing Tool
https://inside.tamuc.edu/campuslife/CampusServices/CITESupportCenter/Zoom_Account.aspx?source=universalmenu

Panopto
https://inside.tamuc.edu/facultyStaffServices/academicTechnology/educational-technology/panopto.aspx

ACCESS AND NAVIGATION

This course will be offered online using D2L, the learning management system used by Texas A&M University-Commerce. To log into the course, go to: myleoonline.tamuc.edu

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu**.**

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

<div align="center">**Student Support**</div>

If you have any questions or are having difficulties with the course material, please contact your Instructor.

<div align="center">**Technical Support**</div>

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:
https://community.brightspace.com/support/s/contactsupport

Interaction with Instructor Statement

The primary form of communication with the class will be through course Announcements and emails. Any changes to the syllabus or other important information critical to the class will be disseminated to students via class Announcements and/or via email through your official university email address available to you through MyLeo. It will be your responsibility to check the course Announcements and your university email regularly.

I generally answer emails within 48 hours. Students who email me after 5:00 PM can expect to receive a reply within 48 hours starting at 8:00 am of the next business day (M-F). Students who email me during holidays or over the weekend should expect a reply within 48 hours from 8:00 AM of the next regularly scheduled business day.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures

Academic Honesty

Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including (but not limited to) receiving a failing grade on the assignment, the possibility of failure in the course and dismissal from the University. Since dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. In **ALL** instances, incidents of academic dishonesty will be reported to the Department Head. Please be aware that academic dishonesty includes (but is not limited to) cheating, plagiarism, and collusion.

Cheating is defined as:
- Copying another's test of assignment
- Communication with another during an exam or assignment (i.e. written, oral or otherwise)
- Giving or seeking aid from another when not permitted by the instructor
- Possessing or using unauthorized materials during the test
- Buying, using, stealing, transporting, or soliciting a test, draft of a test, or answer key

Plagiarism is defined as:
- Using someone else's work in your assignment without appropriate acknowledgement
- Making slight variations in the language and then failing to give credit to the source

Collusion is defined as:
- Collaborating with another, without authorization, when preparing an assignment

If you have any questions regarding academic dishonesty, ask. Otherwise, I will assume that you have full knowledge of the academic dishonesty policy and agree to the conditions as set forth in this syllabus.

Attendance Policy

Students are expected to attend class and actively participate. Student participation/activity will be monitored by the professor. Students should plan to dedicate approximately 15-20 hours/week of time to this course.

APA Citation Format Policy

It is very important that you learn how to cite properly. In some ways, citations are more important than the actual text of your paper/assignment. Therefore, you should take this task seriously and devote some time to understanding how to cite properly. If you take the time to understand this process up front, it will save you a significant amount of time in the long run (not to mention significant deductions in points).

In the social and behavioral sciences, we generally follow the APA (American Psychological Association) formatting style. As a rule of thumb, one cites whenever they are paraphrasing other people's words or when they quote other's words directly. You may learn to cite from a variety of different sources including the APA Tutorial and the sources listed below and in the Getting Started section of your course.
www.apastyle.org
http://owl.english.purdue.edu/owl/resource/560/02/
www.library.cornell.edu/resrch/citmanage/apa

It is the student's responsibility to understand how to cite properly. If you have questions, feel free to ask.

Late Work

It is the student's responsibility to plan accordingly and submit their assignments in a timely manner. Class assignments will be announced. The instructor reserves the right to assign a grade of zero to any late assignment.

Drop Course Policy

Students should take responsibility for dropping themselves from the course according to University policy should this become necessary.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook.

http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: https://www.britannica.com/topic/netiquette

TAMUC Attendance

For more information about the attendance policy please visit the Attendance webpage and Procedure 13.99.99.R0.01.
http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

Undergraduate Academic Dishonesty 13.99.99.R0.03

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf

Graduate Student Academic Dishonesty 13.99.99.R0.10

http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf

Counseling Center

A student that faces a crisis or a serious and unforeseeable event that affects his/her class performance must contact the Counseling Center, Halladay Student Services Building, Room 204, Phone (903) 886-5145. If important class material or course assignments are missed because of such crisis or event, the student must contact the instructor as soon as possible. Website: http://www.tamuc.edu/campusLife/campusServices/counselingCenter/

The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit the following website.
Website: www.tamuc.edu/counsel

Students with Disabilities-- ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this

legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
Texas A&M University-Commerce
Gee Library- Room 162
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
Email: studentdisabilityservices@tamuc.edu

Website: Office of Student Disability Resources and Services

http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the Carrying Concealed Handguns On Campus document and/or consult your event organizer.

Website:
http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

AI Use Policy

Texas A&M University-Commerce acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

MPORTANT DATES

Date	Description
Aug 26, Monday	First day of classes.
Dec 6, Friday	Last day of classes.
Dec 7-13	Week of final examinations.

COURSE CALENDAR

Every effort will be made to adhere to the course calendar below. However, unforeseen circumstances may require changes to the course calendar. In that case, changes will be announced via University Email and in Announcements. The professor reserves the right to change the course calendar if necessary and depending on the progress of the class. I highly recommend that you follow the calendar outlined below **VERY CAREFULLY** so that you are sure to complete readings as assigned and turn your assignments in on time.

AG 505.01W - STATISTICAL METHODS IN AGRICULTURE
Course Calendar, Fall 2024
Web Based Course

Week	Subject/Material Covered	Assignment Due By 11:59 PM on Date Provided
Week 1 Aug 26 – Sep 1	Syllabus + D2L Tutorial (MyLeo Online Student Res Course) Module 1 Sec. 3.1 + 3.2: Measures of Central Tendency and Dispersion	Quiz Lab
Week 2 Sep 2 – 8	Module 2 Sec. 3.4 + 3.5: Measures of Position, Outliers, and Boxplots	Quiz Lab
Week 3 Sep 9 – 15	Module 3 Sec. 4.1 + 4.2 + 4.3 + 14.3: Scatter Diagrams, Correlation, and Least-Squares Regression	Quiz Lab
Week 4 Sep 16 – 22	Exam 1 (CH03 + Sec. 4.1, excludes Sec. 3.3)	Exam 1
Week 5 Sep 23 – 29	Module 4 Prob. Distributions + Sec. 10.1: The Language of Hypothesis Testing	Quiz Lab
Week 6 Sep 30 – Oct 6	Module 5 Sec. 10.3: Hypothesis Tests for a Population Mean	Quiz Lab
Week 7 Oct 7 – 13	Module 6 Sec. 10.2 + 10.5: Hypothesis Tests for a Population Proportion	Quiz Lab
Week 8 Oct 14 – 20	Exam 2 (Prob. Distributions + CH10)	Exam 2
Week 9 Oct 21 – 27	Module 7 Sec. 11.2+11.3: Inference about Two Means	Quiz Lab
Week 10 Oct 28 – Nov 3	Module 8 Sec. 11.1: Inference about Two Population Proportions	Quiz Lab
Week 11 Nov 4 – 10	Module 9 Sec. 12.1: Goodness-of-Fit	Quiz Lab

Week 12 Nov 11 – 17	Module 10 Sec. 12.2: Test for Independence and Homogeneity of Proportions	Quiz Lab
Week 13 Nov 18 – 24	Exam 3 (CH 11 + CH12)	Exam 3
Week 14 Nov 25 – Dec 1	Module 11 Sec. 13.1: One-Way ANOVA	Quiz Lab
Week 15 Dec 2 – 8	Module 12 Sec. 13.2: Post Hoc Test on One-Way ANOVA	Quiz Lab
Week 16 Dec 9 – 13	Exam 4 - Optional Final Comprehensive Exam	Exam 4