

AEC 380 – AGRICULTURAL STATISTICS
Texas A&M University-Commerce
School of Agriculture
Fall 2015

Instructor: Dr. Jose Lopez

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Class Time: TR 11:00 a.m. - 12:15 p.m., AGIT Room 255

Office Hours: For immediate consultation I will be available Mondays and Wednesdays from 10:30 a.m. – 11:30 p.m., and Tuesdays and Thursdays from 2:00 p.m. – 5:00 p.m. or by appointment. You are also welcome to stop by my office at any other time. If I am unable to meet with you at that time, 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 eCollege (<http://www.online.tamuc.org/>). I generally answer emails within 1 business day (8:00 AM-5:00 PM). Emails that arrive after 5:00 PM will be answered the next business day. I don't answer emails on weekends, so make sure you contact me in time.

Required Text: *Fundamental of Statistics* by Michael Sullivan. Prentice-Hall, Inc., New York, 3rd Ed., 2011. (ISBN 9780321641878)

Prerequisites: Math 1314 (MATH 141) or MATH 1324 (MATH 175) or Higher Math.

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 college 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: Principles and estimation techniques used in the analysis of agricultural data including measures of central tendency and dispersion, probability, sampling, hypothesis testing, analysis of variance, correlation coefficient, and regression.

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 datasets.
- Summarize datasets using measures of central tendency and dispersion, diagrams and boxplots.
- Compute linear relationships among variables and use them for prediction.

- Measure the correlation between two agricultural variables and explain the difference between correlation and causation.
- Explain how linear regression is used to make predictions.
- 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

Topics:

Part I: Getting the Information You Need

Chapter 1: Data Collection

Section 1.1: Introduction to the Practice of Statistics

- Concept and process of statistics; concepts of population, sample, individual, descriptive statistics, inferential statistics, parameter, statistic, qualitative variables, and quantitative variables (discrete and continues); levels of measurement of variable (nominal, ordinal, interval, and ratio).

Part II: Descriptive Statistics

Chapter 3: Numerically Summarizing Data

Section 3.1: 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.

Section 3.2: 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); use of Chebyshev's Inequality to determine the minimum percentage of the observations that fall within k standard deviations of the mean (for k values greater than 1).

Section 3.3: Measures of Central Tendency and Dispersion from Grouped Data

- Approximation of the mean, variance, and standard deviation of a variable from data that summarized in frequency distributions; calculation of a weighted mean

Section 3.4: 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.

Section 3.5: The Five-Number Summary and Boxplots

- The five-number summary; boxplots and their use to describe the shapes of distributions.

Chapter 4: Describing the Relation between Two Variables

Section 4.1: Scatter Diagrams and Correlation

- Explanation of response and a predictor variables; drawing and interpretation of scatter diagrams; relationships between two variables (linear and non-linear, and positively and negatively associated; properties, computation, and interpretation of the linear correlation coefficient; discussion of confounding and lurking variables.

Section 4.2: Least-Squares Regression

- Computation of equation of the lines with emphasis on the least-squares regression line; predictions made by using equation of lines; calculation and interpretation of slopes and vertical and horizontal intercepts; properties of the least-squares regression

line; computation and use of the sum of squared residuals to comment on the fit of a line.

Section 4.3: The Coefficient of Determination

- Use of the coefficient of determination (R^2) to measure the linear relation that exists between two quantitative variables; computation and interpretation of the R^2 and its properties; distinction, graphical interpretation, and interpretation of total deviation, explained deviation, and unexplained deviation.

Part III: Inference

Chapter 10: Hypothesis Tests Regarding a Parameter

Section 10.1: 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.

Section 10.2: 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.

Section 10.3: 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.

Section 10.4: Hypothesis Tests for a Population Proportion

- Hypothesis testing about a population proportion with small and large samples; consideration of one and two tail tests.

Section 10.5: Putting It Together: Which Method Do I Use?

- Determination of the appropriate hypothesis test to perform.

Chapter 11: Inferences on Two Samples

Section 11.1: Inferences about Two Means: Dependent Samples

- Hypothesis testing regarding the difference of two dependent means

Section 11.2: Inferences about Two Means: Independent Samples

- Hypothesis testing regarding the difference of two independent means

Additional Topics on CD

Section C.4: Comparing Three or More Means (One-Way Analysis of Variance)

- Hypothesis testing regarding three or more means using one-way ANOVA

Grading:

Exam 1	25%
Exam 2	25%
Exam 3	25%
Quizzes	15%
Attendance & participation	10%
	100%

Note: There would be an optional final comprehensive exam (Exam 4). The optional final comprehensive exam will replace your lowest exam grade (if you decide to take it).

Grading Scale:

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

Exams: No makeup exams will be offered. A grade of zero will be assigned to any missed exams. Make sure you arrive in time.

Quizzes: Quizzes will be graded and discussed in class. Quizzes should be considered very important material for exams. Quizzes will be either pop-quizzes or announced in class.

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 be selected from the textbook. Practice questions will not be graded but should be considered important material for quizzes and exams. Students are encouraged to ask questions during class or during office hours.

Class Attendance: A maximum of two unexcused absences will be allowed. Each additional unexcused absence will reduce your earned attendance grade by 3.33 points (30 meetings * 3.33 ≈ 100 points). The student is expected to use the unexcused absences for the days he/she gets sick or cannot attend to class because of a non-serious foreseeable or unforeseeable cause (e.g., flat tires, car problems, not feeling well, doctor and dentist appointments, visits to health clinics, field trips, sport activities and events, etc.). Excused absences must be for serious and unforeseeable causes, and fully documented. The instructor will pass attendance every class day during the first 5 minutes, except for exam and quiz days. If you are late, but arrive during the first 15 minutes of class, you should contact the instructor at the end of the class and you will earn ½ of a regular class attendance. It is your responsibility to contact the instructor in these cases. Similarly, if you come to class, you are required to stay until the end of the class period; otherwise, you will earn ½ of a regular class attendance.

Class Participation: Students should come to class prepared by reading and completing course assignments prior to class. It is the students' responsibility to be familiar with and understand all previously covered material prior to each new lecture. Class participation is about answering the instructor's questions and/or providing your constructive comments, ideas, or opinion when discussing examples, homework, and in-class exercises. Students are encourage to ask questions when they do not understand the class material.

Students with Disabilities: 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 132

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

StudentDisabilityServices@tamuc.edu

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, 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.

General Policies for Classes: All students enrolled at the University will follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. See Student's Guide Handbook, Rules and Procedures, Code of Student Conduct (<http://www.tamuc.edu/CampusLife/documents/studentGuidebook.pdf>).

Academic Integrity: Students must follow the *Code of Student Conduct* in the *Student Guidebook* (<http://web.tamuc.edu/admissions/studentGuidebook.aspx>). Any form of plagiarism or academic dishonesty will not be tolerated. Academic honesty is defined on *Chapter 13 Students (Academic)* of the *TAMUC Rules and Procedures* (<http://web.tamuc.edu/aboutus/policiesproceduresstandardsstatements/rulesprocedures/>):

“Academic dishonesty” includes, but is not limited to, plagiarism (the appropriation or stealing of the ideas or words of another and passing them off as one’s own), cheating, collusion (the unauthorized collaboration with others), and abuse (destruction, defacing, or removal) of resource material.

Course Design: A tentative class schedule of the material that will be covered each day is provided at the end of this syllabus. Tentative exam dates are also provided. The official exam dates will be announced in class. Quizzes will be either pop-quizzes or announced in class.

eCollege: This course will be enhanced using eCollege. Students are required to download PowerPoint presentations and other important class material from the eCollege website for the course (<http://www.online.tamuc.org/>). You will need your CWID and password to log in to the course. Make sure you visit this website when preparing for class.

If you do not know your CWID or have forgotten your password, contact Technology Services at 903.468.6000 or helpdesk@online.tamuc.org

Technology Requirements: The following information has been provided to assist you in preparing to use technology successfully in this course.

- Internet access/connection – high speed recommended (not dial-up)

- Word and Spreadsheet Processor (i.e. MS Word or Word Perfect and MS Excel or a spreadsheet processor)

Additionally, the following hardware and software are necessary to use eCollege:

Our campus is optimized to work in a Microsoft Windows environment. This means our courses work best if you are using a Windows operating system (XP or newer) and a recent version of Microsoft Internet Explorer (6.0, 7.0, or 8.0).

Your courses will also work with Macintosh OS X along with a recent version of Safari 2.0 or better. Along with Internet Explorer and Safari, eCollege also supports the Firefox browser (3.0) on both Windows and Mac operating systems.

It is strongly recommended that you perform a “Browser Test” prior to the start of your course. To launch a browser test, login in to eCollege, click on the ‘myCourses’ tab, and then select the “Browser Test” link under Support Services.

Important Dates:

Sep. 1 st , Tuesday	First day of this class.
Sep. 3 rd , Thursday	Last Day to Add Courses without Dean and Instructor Approval.
Sep. 7 th , Monday	Last Day to Withdraw (Drop ALL courses) with 80% Refund.
Sep. 16 th , Wednesday	Last Day to Drop Individual 16 Week Courses with 100% Refund.
Sep. 21 th , Monday	Last Day to Withdraw (Drop ALL Courses) with 50% Refund.
Sep. 28 th , Monday	Last Day to Withdraw (Drop ALL Courses) with 25% Refund.
Nov. 5 th , Thursday	Last Day to Drop Individual 16 Week Courses with a Q Grade (No Refund).
Dec. 6 th , Sunday	Last Day to Withdraw (Drop ALL Courses) (NO Refund).
Dec. 10 th , Thursday	Last day of this class.
Dec. 15 th , Tuesday	Optional Final Exam, 10:30 a.m. - 12:30 p.m.

The instructor reserves the right to make modifications to this syllabus during the semester.

AEC 380 AGRICULTURAL STATISTICS
Class Schedule, Fall 2015
TR 11:00 a.m. - 12:15 p.m.

Week of	Subject/Material Covered
Week 1 Sep 1 + Sep 3	Syllabus Sec. 1.1: Intro. to the Practice of Statistics
Week 2 Sep 8 + Sep 10	Sec. 3.1: Measures of Central Tendency
Week 3 Sep 15 + Sep 17	Sec. 3.2: Measures of Dispersion Sec. 3.3: Measures of Central Tendency and Dispersion from Grouped Data
Week 4 Sep 22 + Sep 24	Sec. 3.4 + 3.5: Measures of Position, Outliers, and Boxplots
Week 5 Sep 29 + Oct 1	Exam 1 (Sec. 1.1 + CH03, exclude Sec. 3.3)
Week 6 Oct 6 + Oct 8	Sec. 4.1: Scatter Diagrams and Correlation
Week 4 Oct 13 + Oct 15	Sec. 4.2 + 4.3: Least-Squares Regression and the Coefficient of Determination
Week 7 Oct 20 + Oct 22	Exam 2 (CH03 + CH04, exclude Sec. 3.3)
Week 9 Oct 27 + Oct 29	Sec. 10.1: The Language of Hypothesis Testing
Week 10 Nov 3 + Nov 5	Sec. 10.2 + 10.3: Hypothesis Tests for a Population Mean
Week 11 Nov 10 + Nov 12	Sec. 10.4: Hypothesis Tests for a Population Proportion Sec. 10.5: Putting It Together: Which Method Do I Use?

Week 12 Nov 17 + Nov 19	Exam 3 (CH03 + CH10, exclude Sec. 3.3)
Week 13 Nov. 24 Nov. 26	Sec. 11.1 + 11.2: Inference about Two Means Thanksgiving Holidays: Nov. 26-27 (No Class)
Week 14 Dec 1 + Dec 3	Sec. 11.1 + 11.2 (Cont.)
Week 15 Dec 8 + Dec 10	Sec. C.4: One-Way ANOVA
Week 17 Dec 15	Exam 4 - Optional Final Comprehensive Exam 10:30 a.m.-12:30 p.m.

This is a tentative class schedule. The instructor reserves the right to make any modification.