AEC 380 – AGRICULTURAL STATISTICS
Texas A&M University-Commerce
Department of Agricultural Sciences
Summer 1 2015

Instructor: Dr. Jose Lopez
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Class Section: 01W (Online)

Class Time: M-F (Online)

Office Hours: You can contact me via email at Jose.Lopez@tamuc.edu. Alternatively, you can email me from eCollege (http://www.online.tamuc.org/). I will be available for in-person consultation in my office during business days by appointment only. 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, 3nd 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.
- **Enhanced Learning Outcomes for Graduate Students:** (i) Relate statistical procedures and concepts to their field of interest. (ii) Communicate ideas pertaining their field of interest in a clear and effective written format.

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 3.4: 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
- o Use of the coefficient of determination (R^2) to measure the linear relation that exits 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
- o 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
- o 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
- o 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
- o 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?
- o Determination of the appropriate hypothesis test to perform.

Grading:

Exam 1	15.00%
Exam 2	15.00%
Exam 3	15.00%
Exam 4	15.00%
Exercises – Short Exercises and Short Answers	25.00%
Exercises – MC Questions	10.00%
Video Summaries	5.00%
	100.00%

Note: There would be an optional final comprehensive exam (Exam 5). The optional final comprehensive exam will replace your lowest exam grade (if you decide to take it).

Graduate Credit: To get graduate credit for this course, graduate students will write a term paper and answer additional questions on the exams. The term paper will allow graduate students to reflect on how statistical procedures and concepts from this course are applicable in their field of interest. The term paper should follow an essay format that is at least 5 pages long (using formal English, correct paragraph and sentence structure, and making sure your ideas flow well from one sentence to another) in Times New Roman format, font size 12 with 1" margins all around, and doubled spaced. If applicable, graduate students need to make sure they

appropriately cite and provide reference to any material that is not theirs that they used in their discussion. Graduate students will need to include at the end of their paper a list of any references (the list of references do not count towards the 5 page minimum) and indicate their references in the text as "(Sullivan, 2011)" when citing at the end of a sentence or "According to Sullivan (2011)" when citing at the beginning of a sentence. For example, boxplots are an effective way to summarize the five-number summary (Sullivan, 2011). According to Sulliban (2011), boxplots are an effective way to summarize the five-number summary. Provide the full citation record in alphabetical order in your list of references. For examples, visit: http://www.saea.org/wp-content/uploads/2013/08/reference-style-sheet.pdf.

Grades for graduate students will be determined as follows: 15% Exam 1, 15% Exam 2, 15% Exam 3, 15% Exam 4, 20% Exercises – Short Exercises and Short Answers, and 10% Exercises – MC Questions, 10% Term Paper. Graduate students' video summaries are not included in their final grade, but they are strongly encouraged to view the videos to get or incorporate ideas from the videos in their term paper.

Note: Graduate students must consult their faculty advisor as well as apply for graduate credit for this course to The Graduate School before the twelfth class day (fourth class day for Summer Sessions). Graduate credit is contingent upon approval by the Dean of Graduate Studies.

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: Make sure you take all the mandatory exams (see Class Schedule 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 eCollege. Exams will be timed and are to be completed by 11:59 PM on the due date. Make sure you have internet access and that your laptop battery is fully charged (if using a laptop computer).

Exercises: Exercises will be graded and should be considered very important course material for your exam preparation. Exercises will involve the use of agricultural datasets or will relate to agricultural statistics decisions that students may encounter in their career as a professional. Students will be required to submit their individual answers via eCollege according to the class schedule provided (see Class Schedule below). You will have access to the corresponding course exercises on Monday and Wednesday mornings and they are to be completed by 11:59 PM on the date provided in the Class Schedule below.

Video Summaries: Every other chapter you will watch a video online. You will be required to submit your individual video summaries via eCollege according to the class schedule provided (see Class Schedule below). The videos will highlight current trends in the discipline and/or enhance the understanding of the discipline or the course material.

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. Email is the best way to contact me. I will be available for in-person consultation in my office by appointment only.

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://www.tamuc.edu/admissions/onestopshop/undergraduateAdmissions/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://www.tamuc.edu/aboutus/policiesproceduresstandardsstatements/rulesProcedures/default.aspx*):*

"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: The dates for all class activities and exams are announced in the Class Schedule provided at the end of this syllabus.

Course access and navigation: This course will be facilitated using eCollege. Students are required to access important class material from the eCollege website for the course. To get started with the course, go to: http://www.online.tamuc.org/. You will need your CWID and password to log in to the course. Make sure you visit this website every day.

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 Processor (i.e. MS Word or Word Perfect)

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:

June 7th, Sunday	Last day to remove Summer I schedule with 100% refund (withdraw)
June 8nd, Monday	First class day.
June 9th, Tuesday	Last day to add a Summer I class without instructor and dean approval
June 10th, Wednesday	Last day to withdraw (from ALL courses) with 80% refund
June 11th, Thursday	Last day to drop (while remaining enrolled) with 100% refund
June 16th, Tuesday	Last day to withdraw (from ALL courses) with a 50% refund
June 29th, Monday	Last day to drop (no refund) while remaining enrolled
July 2nd, Thursday	Last day to withdraw (from ALL courses) with no refund
July 9th, Thursday	Last class day
July 9th, Thursday	Final exam

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

AEC 380 AGRICULTURAL STATISTICS
Class Schedule, Summer 1 2015
Web Based Class

Day	Date	Subject/Material Covered	Assignment Due By 11:59 PM on Date Provided
Week 1			
Mon.	Jun 8	Syllabus eCollege Tutorial Sec. 1.1: Intro. to the Practice of Statistics	eCollege Tutorial Video Summaries
Tue.	Jun 9	Sec. 1.1 (Cont.)	Exercise - SE or SA Exercise - MC
Wed.	Jun 10	Sec. 3.1: Measures of Central Tendency	
Th.	Jun 11	Sec. 3.1 (Cont.)	Exercise - SE or SA Exercise - MC
Fr.	**Jun 12**	**Exam 1 (Sec. 1.1 + 3.1)**	**Exam 1**
Week 2			
Mon.	Jun 15	Sec. 3.2: Measures of Dispersion	Video Summaries
Tue.	Jun 16	Sec. 3.2 (Cont.)	Exercise - SE or SA Exercise - MC
Wed.	Jun 17	Sec. 3.4 + 3.5: Measures of Position, Outliers, and Boxplots	
Th.	Jun 18	Sec. 3.4 + 3.5 (Cont.)	Exercise - SE or SA Exercise - MC
Fr.	**Jun 19**	**Exam 2 (CH03, exclude Sec. 3.3)**	**Exam 2**
Week 3			
Mon.	Jun 22	Sec. 4.1: Scatter Diagrams and Correlation	Video Summaries
Tue.	Jun 23	Sec. 4.1 (Cont.)	Exercise - SE or SA Exercise - MC

Wed.	Jun 24	Sec. 4.2 + 4.3: Least-Squares Regression and the Coefficient of Determination	
Th.	Jun 25	Sec. 4.2 + 4.3 (Cont.)	Exercise - SE or SA Exercise - MC
Fr.	**Jun 26**	**Exam 3 (CH03 + CH04, exclude Sec. 3.3)**	**Exam 3**
		Week 4	
Mon.	Jun 29	Sec. 10.1: The Language of Hypothesis Testing	Video Summaries
Tue.	Jun 30	Sec. 10.1 (Cont.)	Exercise - SE or SA Exercise - MC
Wed.	Jul 1	Sec. 10.2 + 10.3: Hypothesis Tests for a Population Mean	
Th.	Jul 2	Sec. 10.2 + 10.3 (Cont.)	Exercise - SE or SA Exercise - MC
Fr.	**Jul 3**	**Exam 4 (Sec. 10.1, 10.2, and 10.3)**	**Exam 4**
		Week 5	
Mon.	Jul 6	Sec. 10.4: Hypothesis Tests for a Population Proportion	Video Summaries
Tue.	Jul 7	Sec. 10.4 (Cont.)	Exercise - SE or SA Exercise - MC
Wed.	Jul 8	Study day	
Th.	**Jul 9**	**Optional Exam 5 (Sec. 1.1, CH03, CH04, and CH10, excludes Sec. 3.3)**	

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