



**AG 505.01W – STATISTICAL METHODS IN AGRICULTURE  
SCHOOL OF AGRICULTURE  
FALL 2016**

## **COURSE SYLLABUS**

### **Instructor**

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### **Class Time**

Web Based Course

### **Office Hours**

You can contact me via email at [Jose.Lopez@tamuc.edu](mailto:Jose.Lopez@tamuc.edu). Alternatively, you can 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. If you wish to visit with me in person, you are also welcome to stop by my office at any time during regular working hours. If you are unable to get a hold of me, please send me an email requesting an appointment.

## **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 4<sup>th</sup> or 3<sup>rd</sup> 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.

## 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:

- 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.
- 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 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
  - Chi-Square Distribution
  - The F-Distribution

## Part III: Inference

- **Topic 4: Hypothesis Tests Regarding a Parameter**
  - 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.
  - 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.
  - 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.
  - 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**
  - Inference about two means: dependent samples

- Inference about two means: independent samples
- Inference about population proportions
- Inference for two population standard deviations
- **Topic 6: Inference on Categorical data**
  - Goodness-of-Fit Test
    - Chi-square distribution
    - Expected counts
  - Test for independence and the homogeneity of proportions
- **Topic 7: Comparing three or more means**
  - One-way analysis of variance
    - Requirements to perform a one-way ANOVA
    - Test a hypothesis regarding three or more means using one-way ANOVA
      - ANOVA F-Test Statistic
  - Tukey Test
  - The randomized complete block design
  - Two-way analysis of variance

## GRADING

### Grading

Exam 1	23.33%
Exam 2	23.33%
Exam 3	23.34%
Exercises	20.00%
Labs	10.00%
	100.00%

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

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 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 a laptop battery 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 course calendar provided (see Course Calendar below). You will have access to the corresponding course exercises on Monday mornings and they are to be completed by 11:59 PM on the date provided in the Course Calendar below.

## 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 the use Microsoft Excel to solve practical problems and make informed decisions using data. Students will be required to submit their individual answers via eCollege according to the course calendar provided (see Course Calendar below). You will have access to the corresponding Labs on Monday mornings and they are to be completed by 11:59 PM on the date provided in the Course Calendar below.

## 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.

## **TECHNOLOGY REQUIREMENTS**

- To fully participate in online courses, you will need to use a current, Flash enabled browser. For PC users, the suggested browser is Internet Explorer 9.0 or 10. For Mac users, the most current update of Firefox is suggested.
- You will need regular access to a computer with a broadband Internet connection. The minimum computer requirements are:
  - 512 MB of RAM, 1 GB or more preferred
  - Broadband connection required courses are heavily video intensive

- Video display capable of high-color 16-bit display 1024 x 768 or higher resolution
- You must have a:
  - sound card, which is usually integrated into your desktop or laptop computer
  - speakers or headphones.
- Depending on your course, you might also need a:
  - webcam
  - microphone
  - headphones
- Both versions of Java (32 bit and 64 bit) must be installed and up to date on your machine. Java can be downloaded at: <http://www.java.com/en/download/manual.jsp>
- Current anti-virus software must be installed and kept up to date.
- You will need some additional free software for enhanced web browsing. Ensure that you download the free versions of the following software:
  - Adobe Reader
  - Adobe Flash Player
- At a minimum, you must have Microsoft Office 2013, 2010, 2007 or Open Office. Microsoft Office is the standard office productivity software utilized by faculty, students, and staff. Microsoft Word is the standard word processing software, Microsoft Excel is the standard spreadsheet software, and Microsoft PowerPoint is the standard presentation software. Copying and pasting, along with attaching/uploading documents for assignment submission, will also be required. If you do not have Microsoft Office, you can check with the bookstore to see if they have any student copies.
- For additional information about system requirements, please refer to the Technology Requirements link at: <http://www.online.tamuc.org>

## **ACCESS, NAVIGATION, AND SUPPORT**

### **Pearson LearningStudio Access and Log in Information**

This course will be facilitated using Pearson LearningStudio, the learning management system used by Texas A&M University-Commerce. To get started with the course, go to:

<http://www.tamuc.edu/myleo.aspx>.

**You will need your CWID and password to log in to the course. If you do not know your CWID or have forgotten your password, contact Technology Services at 903.468.6000 or [helpdesk@tamuc.edu](mailto:helpdesk@tamuc.edu).**

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

## Pearson LearningStudio Student Technical Support

Texas A&M University-Commerce provides students technical support in the use of Pearson LearningStudio.

Technical assistance is available 24 hours a day/ 7 days a week.

If at any time you experience technical problems (e.g., you can't log in to the course, you can't see certain material, etc.) please contact the Pearson LearningStudio Help Desk, available 24 hours a day, seven days a week.

The student help desk may be reached by the following means 24 hours a day, seven days a week.

- **Chat Support:** Click on '*Live Support*' on the tool bar within your course to chat with an Pearson LearningStudio Representative.
- **Phone:** 1-866-656-5511 (Toll Free) to speak with Pearson LearningStudio Technical Support Representative.
- **Email:** [helpdesk@online.tamuc.org](mailto:helpdesk@online.tamuc.org) to initiate a support request with Pearson LearningStudio Technical Support Representative.

**Accessing Help from within Your Course:** Click on the '*Tech Support*' icon on the upper left side of the screen inside the course. You will then be able to get assistance via online chat, email or by phone by calling the Help Desk number noted below.

**Note:** Personal computer 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, an Internet cafe, or a bookstore, such as Barnes & Noble, etc.

**For assistance with the library:** To access the Library databases and tutorials click on the Library link under Course Home or minimize your Pearson LearningStudio session and open another browser window going to the Library's web site directly, at the following link: <http://www.tamuc.edu/library> not from within Pearson LearningStudio.

## Policy for Reporting Problems with Pearson LearningStudio

Should students encounter Pearson LearningStudio based problems while submitting assignments, exercises, labs, quizzes and exams, the following procedure **MUST** be followed?

1. Students must report the problem to the help desk. You may reach the helpdesk at [helpdesk@online.tamuc.org](mailto:helpdesk@online.tamuc.org) or 1-866-656-5511
2. Students **MUST** file their problem with the helpdesk and obtain a helpdesk ticket number
3. Once a helpdesk ticket number is in your possession, students should email me to advise me of the problem and to provide me with the helpdesk ticket number
4. At that time, I will call the helpdesk to confirm your problem and follow up with you

**PLEASE NOTE:** Your personal computer/access problems are not a legitimate excuse for filing a ticket with the Pearson help desk. You are strongly encouraged to check for compatibility of your browser **BEFORE** the course begins and to take the Pearson LearningStudio tutorial

offered for students who may require some extra assistance in navigating the Pearson LearningStudio platform. **ONLY** Pearson LearningStudio based problems are legitimate.

### **Internet Access**

An Internet connection is necessary to participate in discussions and assignments, access readings, transfer course work, and receive feedback from your professor. View the requirements as outlined in Technology Requirements above for more information.

### **MyLeo Support**

Your myLeo email address is required to send and receive all student correspondence. Please email [helpdesk@tamuc.edu](mailto:helpdesk@tamuc.edu) or call us at 903-468-6000 with any questions about setting up your myLeo email account. You may also access information at <https://leo.tamuc.edu>.

### **Learner Support**

Go to the following link [One Stop Shop](http://www.tamuc.edu/admissions/onestopshop/) (<http://www.tamuc.edu/admissions/onestopshop/>) - created to serve you by attempting to provide as many resources as possible in one location. Go to the following link [Academic Success Center](http://www.tamuc.edu/campusLife/campusServices/academicSuccessCenter/) (<http://www.tamuc.edu/campusLife/campusServices/academicSuccessCenter/>) - focused on providing academic resources to help you achieve academic success.

### **Course Navigation**

All aspects of this course, including assignments, exercises, labs, quizzes and exams will be completed / turned in through Pearson LearningStudio. Your grades will also be available in Pearson LearningStudio.

This course like the others in the program is divided up into weekly modules. Each module will have a(n) Overview, Objectives, Handout, Assignments, Practice Questions, Review Questions, Homework, Exercises and Labs. The Assignments section in each Module tab will provide you with a list of everything you need to do to be successful in the course. There will also be an announcement with a list of everything you need to do for each weekly module. You should begin by reading the course syllabus and the course announcements, paying particular attention to the information about assignments and course calendar.

## **COMMUNICATION WITH INSTRUCTOR**

### **Interaction with Instructor Statement**

My 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 me through MyLeo. It will be your responsibility to check the course Announcements and your University Email regularly.

Students who Email me outside of regular working hours (8:00 AM – 5:00 PM) can expect a reply within 24 hours M-F from 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 24 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 or 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**

While this is an online course, 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://www.apastyle.org)

<http://owl.english.purdue.edu/owl/resource/560/02/>

[www.library.cornell.edu/resrch/citmanage/apa](http://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. Students have a full week to complete assignments (see COURSE CALENDAR below). The instructor reserves the right to assign a grade of zero to any late assignment. Please be aware that in many instances Pearson LearningStudio will not allow you to submit your assignment after the due date.

### **Drop Course Policy**

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

### **University Specific Procedures**

#### **ADA Statement - 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**

University Email address: [StudentDisabilityServices@tamuc.edu](mailto:StudentDisabilityServices@tamuc.edu)

University website address:

<http://www.tamuc.edu/campuslife/campusservices/studentDisabilityResourcesAndServices/default.aspx>

### **Student Conduct**

All students enrolled at the University shall 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>).

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: <http://www.albion.com/netiquette/corerules.html>

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.

### **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.

### **Campus Concealed Carry**

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 (<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>) and/or consult your event organizer). 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.

### **IMPORTANT DATES**

Aug. 29 <sup>th</sup> , Monday	First day of class.
Dec. 9 <sup>th</sup> , Friday	Last day of class.
Dec. 10 – Dec. 16	Week of final examination.

### **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 - STATISTICAL METHODS IN AGRICULTURE**  
**Course Calendar, Fall 2016**  
**Web Based Class**

Week	Subject/Material Covered	Assignment Due By 11:59 PM on Date Provided
Week 1 Aug 29 - Sep 2	Module 1 Sec. 3.1 + 3.2: Measures of Central Tendency and Dispersion	eCollege Tutorial
Week 2 Sep 5 - Sep 9	Module 2 Sec. 3.4 + 3.5: Measures of Position, Outliers, and Boxplots	Exercise - SE or SA Exercise - MC Lab
Week 3 Sep 12 - Sep 16	Module 3 Sec. 4.1 + 4.2 + 4.3: Scatter Diagrams, Correlation, and Least-Squares Regression	Exercise - SE or SA Exercise - MC Lab
Week 4 Sep 19 - Sep 23	Exam 1 (CH03 + CH04)	Exam 1
Week 5 Sep 26 - Sep 30	Module 4 Prob. Distributions + Sec. 10.1: The Language of Hypothesis Testing	Exercise - SE or SA Exercise - MC Lab
Week 6 Oct 3 - Oct 7	Module 5 Sec. 10.3: Hypothesis Tests for a Population Mean	Exercise - SE or SA Exercise - MC Lab
Week 7 Oct 10 - Oct 14	Module 6 Sec. 10.2 + 10.5: Hypothesis Tests for a Population Proportion	Exercise - SE or SA Exercise - MC Lab
Week 8 Oct 17 - Oct 21	Exam 2 (Prob. Distributions + CH10)	Exam 2
Week 9 Oct 24 - Oct 28	Module 7 Sec. 11.2+11.3: Inference about Two Means	Exercise - SE or SA Exercise - MC Lab
Week 10 Oct 31 - Nov 4	Module 8 Sec. 11.1: Inference about Two Population Proportions	Exercise - SE or SA Exercise - MC Lab
Week 11 Nov 7 - Nov 11	Module 9 Sec. 12.1: Goodness-of-Fit	Exercise - SE or SA Exercise - MC

		Lab
Week 12 Nov 14 - Nov 18	Module 10 Sec. 12.2: Test for Independence and Homogeneity of Proportions	Exercise - SE or SA Exercise - MC Lab
Week 13 Nov 21 - Nov 25	Exam 3 (CH 11 + CH12)	Exam 3
Week 14 Nov 28 - Dec 2	Module 11 Sec. 13.1+13.2: One-Way ANOVA and Post Hoc Tests	Exercise - SE or SA Exercise - MC Lab
Week 15 Dec 5 - Dec 9	Module 13 Sec. 13.4: Two-Way ANOVA	Exercise - SE or SA Exercise - MC Lab
Week 16 Dec 10 - Dec 16	Exam 4 - Optional Final Comprehensive Exam	Exam 4