Course Syllabus – Statistical Methods

MATH 1342.005 & MATH 1342.010 – Fall 2018

Department: Mathematics and Engineering   **Instructor:** Denise Johansen

Discipline: Mathematics   **Office:** RC 223D; (806)716-4632

Course Number: Math 1342   **Cell/Text:** (513)227-0095

Course Title: Statistical Methods   **Email:** djohansen@southplainscollege.edu

Credit: 3   **Lecture:** 3   **Lab:** 0   **Time/Place:** ARR/Internet

Reese Campus Office Hours: MTWR 11am-12pm, TR 6pm-7pm, F 9am-12pm, or by appointment

Virtual Office Hour: Mondays 8pm-9pm

This course satisfies a core curriculum requirement: Yes – mathematics

Prerequisites: 2 years of high school algebra or Math 0320, TSI compliance

Available Formats: conventional/internet

Campuses: Levelland Campus, Reese Campus, Plainview

Course Description: This course is a study of the methods of analyzing data, statistical concepts and models, estimation, tests of significance, introduction to analysis of variance, linear regression, and correlation.

Course Purpose/Rationale/Goal: To provide a transferable course in the elements of statistical methods.

Student Learning Outcomes/Competencies:
These course outcomes are listed with the relevant section numbers from the textbook that support them.

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Upon completion of this course and receiving a passing grade, the student will be able to:

1. represent raw data using frequency distributions (2.1)
2. represent raw data using polygons, ogives, histograms, and pie charts (2.1, 2.2)
3. calculate measures of central tendency, variation, and position for both grouped and ungrouped data and interpret in writing the significance and meaning of the calculations (2.3, 2.4, 2.5)
4. calculate coefficients of variation and skewness and interpret in writing the significance of the calculations (2.4)
5. calculate classical and empirical probabilities (3.1, 3.2, 3.3)
6. apply binomial, Poisson, and normal distribution properties to calculate probabilities and interpret in writing the significance of the calculations (4.1, 4.2, 5.2)
7. calculate mean, variance, and standard deviations of probability distributions and interpret in writing the significance of test results (4.1, 4.2, 6.1, 6.2, 6.3)
8. evaluate a hypothesis testing situation to determine the appropriate test to be used (6.1, 6.2, 6.3, 7.1, 7.2, 7.3, 7.4, 8.1, 8.2, 8.3, 8.4, 9.1, 9.3, 10.4)
9. use parametric and non-parametric tests for hypothesis testing and interpret in writing the significance of test results (6.1, 6.2, 6.3, 7.1, 7.2, 7.3, 7.4, 8.1, 8.2, 8.3, 8.4, 9.1, 9.3, 10.4)
10. calculate simple and multiple linear regression equations and use equations to make predictions (9.2. 9.3)
11. calculate coefficients of correlation, determination, and non-determination and interpret in writing the significance of the calculations (9.1, 9.2. 9.3)
12. use a computer statistics program and/or a statistical calculator to help with computations (2.3, 2.4, 2.5, 4.1, 4.2, 5.1, 5.2, 5.3, 5.4, 6.1, 6.2, 6.3, 7.1, 7.2, 7.3, 7.4, 8.1, 8.2, 8.3, 8.4, 9.1, 9.2, 9.3, 10.4)

Core Objectives:

Communication Skills:
effective development, interpretation, and expression of ideas through written, oral, and visual communication.

- Develop, interpret, and express ideas through written communication
- Develop, interpret, and express ideas through oral communication
- Develop, interpret, and express ideas through visual communication

Critical Thinking:
creative thinking, innovation, inquiry, analysis, evaluation, and synthesis of information.

- Generate and communicate ideas by combining, changing, and reapplying existing information
- Gather and assess information relevant to a question
- Analyze, evaluate, and synthesize information

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Empirical and Quantitative Competency Skills:
the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.

- Manipulate and analyze numerical data and arrive at an informed conclusion
- Manipulate and analyze observable facts and arrive at an informed conclusion

Physical Textbook (Optional): Elementary Statistics: Picturing the World 7/e, Farber, Betsy | Larson, Ron. Pearson. ISBN-13: 9780134683416.

Supplies (Required):
> Calculator: I HIGHLY recommend a graphing calculator with statistics package; TI-83/84 are preferred, but other models will work. For other models, you will have to read your manual to learn how the various statistics commands work. NOTE: You may NOT use a calculator program on your phone.
> MyStatLab access code: Purchase from MyMathLab.com or from SPC Bookstore. CourseID **johansen46567** (includes access to electronic version of textbook).

Technology Required:
> Working, reliable internet access
> Access to our Blackboard class. Login at http://southplainscollege.blackboard.com
> MyStatLab website. Login at MyMathLab.com or MyStatLab.com

Course Delivery: This course is an online course, so you will access course information and correspond with me through use of the internet. I use MyStatLab to deliver and manage this course. I am available by phone or face-to-face visit in my office on the Reese campus during my posted office hours. I can also be reached by phone or text using my cellphone number (513-227-0095) during reasonable hours. If you have to leave a message, my response time is 1 business day or less. I will also hold a weekly webinar in the evening where you can call in to ask questions and see a virtual whiteboard where we can work out problems together.

Course Requirements: To maximize the potential to complete this course, a student should login to MyMathLab at least 3 times a week, read the required textbook sections, watch the required lecture videos and take notes, thoroughly complete all homework assignments, and prepare well for examinations, including final examinations. Additionally, students are expected to check and respond to email communications.

Learning Materials/Activities: To be successful in this course, you will use the following materials and complete the given activities for each section of the textbook that we will cover.
- Textbook reading – Read the section in your textbook, whether you use a physical book or the eText inside MyStatLab. As you read, you should write notes on any new vocabulary words (usually in boldface type), formulas, theorems, and calculator commands. The reading is probably your first introduction to the concepts.

- Explore assignment - Explore assignments for each section will be posted in MyStatLab under the Assignments button and will contain video lectures, vocabulary/concept check questions, and sometimes applet animations or StatCrunch exercises. As you view the videos/animations, you should add any new information to your textbook notes and copy into your notes any examples worked for you in the video, just as if you were sitting in class with that instructor. The exploration assignment is like a guided practice—concepts are still very new, but you should be getting more familiar with them.
- Homework assignment – Homework assignments for each section will be posted in MyStatLab under the Assignments button and will contain questions that may be multiple choice or fill-in-the-blank, but are primarily open-ended questions for problems that you work out. The questions generally give you 3 chances to get the question right before marking the problem wrong. You will then have access to a Similar Question button that will give you a new question and 3 more chances to get the question right. You have unlimited attempts on homework questions, so if you are persistent, do your work on time, and learn from your mistakes, you can earn 100% on all homework assignments. Also, every homework question has a Question Help button in the top right corner that will walk you through the solution, show you a similar example, link to the textbook section, sometimes links to a video example, or gives you a button to Ask My Instructor which sends me an email with your question. The purpose of homework is to practice, practice, practice! This is where you actually are learning the concepts, not just watching someone else work problems.
- Discussion board assignment – Not for each section we cover, but these are assignments for you to get to know other students in the class, look for uses of statistics in the real world, discuss strategies for solving statistical problems, and generally get help from me and each other.

Course Evaluation:
- The Explore average will be worth 10% of your grade.
- The homework average is worth 20% of your grade, and the lowest 3 homework grades will be dropped.
- There will be 9 online Quizzes (1 per chapter we cover) posted in MyStatLab under the Assignments button. You may prepare ONE 3"x5" handwritten notecard for your reference for each quiz, but other than that notecard and your calculator, each quiz is to be **completed on your own and without references**—no using your text, no Google, no Phone a Friend. The purpose of each quiz is to help you review the chapter and start to see the "bigger picture", rather than just one section at a time. Quizzes are TIMED and help get you ready for the Exams. You have two attempts on each quiz (I HIGHLY recommend taking your first attempt early enough that you have time to review your errors before taking the quiz again), and only the highest of your two attempts will count in your average. The Quiz Average is worth 15% of your grade, and the lowest 2 quiz grades will be dropped.
- There will be a cumulative final project posted on Blackboard, worth 10% of your grade.
- There will be 5 required Discussion boards during the semester, worth a total of 5% of your grade.

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- There will be 2 proctored paper/pencil/calculator/notecard exams during the semester, a midterm and a final exam, each worth 20% of your grade. The Midterm and Final Exam must be proctored, completed and returned to the instructor by the dates listed in the course calendar, and will be timed at 2 hours. A "Proctor Form" is available on Blackboard and will be emailed out at the beginning of the semester so you can find an appropriate proctor and provide the requested information about the proctor to me. All proctors MUST BE APPROVED by the instructor. You must complete the "Proctor Form" and return it to me on or before Tuesday, September 11th.
  - Midterm Exam (Chapters 1-5) - must take either Wednesday, 10/17, from 8am-10am on Levelland campus, Room ??? OR Wednesday, 10/17, from 6pm-8pm on Reese campus, Room 232.
  - Final Exam (Chapters 6-10) - must take either Tuesday, 12/11, from 5:30pm-7:30pm on Reese campus, Room 232 OR Wednesday, 12/12, from 8am-10am on Levelland campus, Room ???.
  You will need to arrange your school/life/work schedules to accommodate taking the midterm and final exams at the specified times. If you do not, you will receive a grade of a 0 for that exam.
- **Late work:** Late work on Explore, Homework, and Quizzes will be accepted in MyStatLab with a 10% deduction **per day** late. This means that if an assignment has 10 questions, and you get 9 of them correct and on time, you earned a 90% on the assignment. If you get the same 9 of them correct, but 2 days late, you have earned 80% of 90%, which is only 72%. PLEASE do your assignments on time; don't shoot yourself in the foot!

Grading Policy:

Explore average	10%
Homework average	20%
Quiz average	15%
Final project	10%
Discussion boards	5%
Midterm exam	20%
Final exam	20%

Letter Grades:

90% - 100%	A
80% - 89%	B
70% - 79%	C
60% - 69%	D
59% & below	F

How your work is graded: MyStatLab grades online assignments as a percentage based on how many parts of a question were answered correctly, and these grades are immediately included in your class average and in your MyStatLab Gradebook. For the Exams that I grade, I give a percentage of points based on how many parts of the question were answered correctly. For example, for a question about calculating a normal probability, I expect to see a drawing of a normal curve labeled correctly, the correct calculator command being used, the correct probability found, and a complete sentence stating your conclusion (if applicable). I will upload Exam grades into MyStatLab within 48 hours of their due dates, and MyStatLab will update your Gradebook and current class average to include those scores.

Response times for grading:

- Explore/Homework - Graded immediately by MyStatsLab, reviewed by me within 1 business day if you contact me with a specific question/issue.

- Quiz - Graded immediately by MyStatsLab, reviewed by me within 48 hours.
- Exam - Graded by me within 48 hours of due date.

Attendance Policy: Because this is an online class, there are no scheduled meetings other than the dates that you are taking in-class exams. For our purposes, you must login to MyMathLab and work on at least 1 assignment per week. Failure to login or do any work for 2 weeks in a row will result in you being administratively withdrawn from the course with a grade of 'F' or 'X'.

Last day to drop is Thursday, November 15th.

SPC School Holidays:
    Monday, 9/3, Labor Day Holiday
    Friday, 10/12, Fall Break
    Wednesday-Friday, 11/21-11/23, Thanksgiving Holiday

Academic Integrity: It is the aim of the faculty of South Plains College to foster a spirit of complete honesty and a high standard of integrity. The attempt of any student to present as his or her own any work which he or she has not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offender liable to serious consequences, possibly suspension.

Cheating: Dishonesty of any kind on examinations or on written assignments, illegal possession of examinations, the use of unauthorized notes during an examination, obtaining information during an examination from the textbook or from the examination paper of another student, assisting others to cheat, alteration of grade records, illegal entry or unauthorized presence in an office are examples of cheating. Complete honesty is required of the student in the presentation of any and all phases of course work. This applies to quizzes of whatever length, as well as to final examinations, to daily reports and to term papers. Students caught cheating will receive a 0 on that assignment and face disciplinary action that can include being dropped from the class with a grade of 'F' and suspension from school.

Language: Please be respectful of others and use language that is appropriate to the workplace. Remember that you are addressing a group. Even though you don't see them, they will be reading. This means several things:
- Don't say things that you wouldn't say publicly.
- Don't address comments to individuals unless you want all to know what you are telling that person.
- Don't share confidential information. If you are quoting from something another person has sent you personally, ask their permission first.
- Read your message before you send it since once it is out there, you can't change it.

Diversity Statement
In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about ourselves. By promoting diversity and

intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.

Disability Statement: Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Special Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Special Services Coordinator. For more information, call or visit the Disability Services Office at Levelland (Student Health & Wellness Office) 806-716-2577, Reese Center (Building 8) 806-716-4675, or Plainview Center (Main Office) 806-716-4302 or 806-296-9611. The Disability Services website is at http://www.southplainscollege.edu/health/disabilityservices.php, and email is dvalles@southplainscollege.edu.

Title IX Pregnancy Accommodations Statement: If you are pregnant, or have given birth within six months, Under Title IX you have a right to reasonable accommodations to help continue your education. To activate accommodations you must submit a Title IX pregnancy accommodations request, along with specific medical documentation, to the Director of Health and Wellness. Once approved, notification will be sent to the student and instructors. It is the student's responsibility to work with the instructor to arrange accommodations. Contact Chris Straface, Director of Health and Wellness at 806-716-2362 or email cstraface@southplainscollege.edu for assistance.

Non-Discrimination Statement: South Plains College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Vice President for Student Affairs, South Plains College, 1401 College Avenue, Box 5, Levelland, TX 79336. Phone number 806-716-2360.

Campus Concealed Carry Statement: Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in South Plains College 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 South Plains College policy, license holders may not carry a concealed handgun in restricted locations. For a list of locations and Frequently Asked Questions, please refer to the Campus Carry page at: http://www.southplainscollege.edu/campuscarry.php

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all South Plains College campuses. Report violations to the College Police Department at 806-716-2396 or 9-1-1.

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COURSE OUTLINE / CALENDAR*

Problems are assigned online for each section of the textbook that we cover. To access online assignments, you must have an access code (you can buy a code for MyMathLab bundled with your textbook or you can buy just the code at www.mymathlab.com) and register for our course (Course ID: **Johansen46567**) at www.mymathlab.com Assignments have due dates, and you will lose 10% per day for work completed after the due date passes. To master the material and prepare for the exams, you **MUST** work extra problems!

*   Assignments and deadlines are subject to change at instructor's discretion, and all changes will be emailed to the class and posted in Blackboard and MyMathLab Announcements.

Date	Content	Assignments
Week 1 8/27-9/2	**Orientation & Introduction to Statistics (Part 1)** • Syllabus & Orientation • 1.1 – An Overview of Statistics • 1.2 – Data Classification	Read Sections 1.1, 1.2 MML Orientation MML Explore 1.1, 1.2 MML Hwk 1.1, 1.2 Discussion 1 – Introduce Yourself **Due 11:59pm, 9/3**
Week 2 9/3-9/9	**Introduction to Statistics (Part 2) & Descriptive Statistics (Part 1)** • **9/3 - Labor Day Holiday – No Classes!** • 1.3 – Data Collection and Experimental Design • 2.1 – Frequency Distributions and Their Graphs	Read Sections 1.3, 2.1 MML Explore 1.3, 2.1 MML Hwk 1.3, 2.1 MML Quiz 1 – Chapter 1 Discussion 2 – Sampling Methods **Due 11:59pm, 9/9**
Week 3 9/10-9/16	**Descriptive Statistics (Part 2)** • 2.2 – More Graphs and Displays • 2.3 – Measures of Central Tendency • 2.4 – Measures of Variation	Read Sections 2.2-2.4 MML Explore 2.2-2.4 MML Hwk 2.2-2.4 **Due 11:59pm, 9/16**
Week 4 9/17-9/23	**Descriptive Statistics (Part 3) & Probability (Part 1)** • 2.5 – Measures of Position • 3.1 – Basic Concepts of Probability and Counting • 3.2 – Conditional Probability and the Multiplication Rule	Read Sections 2.5, 3.1-3.2 MML Explore 2.5, 3.1-3.2 MML Hwk 2.5, 3.1-3.2 MML Quiz 2 – Chapter 2 Discussion 3 – Stats in the Real World **Due 11:59pm, 9/23**

Week 5 9/24-9/30	**Probability (Part 2) & Discrete Probability Distributions** • 3.3 – The Addition Rule • 4.1 – Probability Distributions • 4.2 – Binomial Distributions	Read Sections 3.3, 4.1-4.2 MML Explore 3.3, 4.1-4.2 MML Hwk 3.3, 4.1-4.2 MML Quiz 3 – Chapter 3 MML Exam I Review **Due 11:59pm, 9/30**
Week 6 10/1-10/7	**Normal Probability Distributions (Part 1)** • 5.1 – Introduction to Normal Distributions and the Standard Normal Distribution • 5.2 – Normal Distributions: Finding Probabilities • 5.3 – Normal Distributions: Finding Values	Read Sections 5.1-5.3 MML Explore 5.1-5.3 MML Hwk 5.1-5.3 **Due 11:59pm, 10/7**
Week 7 10/8-10/14	**Normal Probability Distributions (Part 2) & Review for Midterm Exam** • 5.4 – Sampling Distributions and The Central Limit Theorem • Review for Midterm Exam • **10/12 – Fall Break – No Classes!**	Read Section 5.4 MML Explore 5.4 MML Hwk 5.4 MML Quiz 5 – Chapter 5 MML Review Quiz (Chapters 1-5) MML Review Hwk **Due 11:59pm, 10/15**
Week 8 10/15-10/21	**Midterm Exam & Confidence Intervals (Part 1)** • **Midterm Exam** • 6.1 – Confidence Intervals for the Mean (Large Samples)	Read Section 6.1 MML Explore 6.1 MML Hwk 6.1 **Due 11:59pm, 10/21**
Week 9 10/22-10/28	**Confidence Intervals (Part 2)** • 6.2 – Confidence Intervals for the Mean (Small Samples) • 6.3 – Confidence Intervals for Population Proportions	Read Sections 6.2,6.3 MML Explore 6.2,6.3 MML Hwk 6.2,6.3 MML Quiz 6 – Chapter 6 Discussion 4 – What Kind of Interval is This? **Due 11:59pm, 10/28**
Week 10 10/29-11/4	**Hypothesis Testing with One Sample (Part 1)** • 7.1 – Introduction to Hypothesis Testing • 7.2 – Hypothesis Testing for the Mean (Large Samples) • 7.3 – Hypothesis Testing for the Mean (Small Samples)	Read Sections 7.1-7.3 MML Explore 7.1-7.3 MML Hwk 7.1-7.3 **Due 11:59pm, 11/4**

Week 11 11/5-11/11	**Hypothesis Testing with One Sample (Part 2) & Hypothesis Testing with Two Samples (Part 1)** • 7.4 – Hypothesis Testing for Proportions • 8.1 – Testing the Difference Between Means (Large Independent Samples) • 8.2 – Testing the Difference Between Means (Small Independent Samples)	Read Sections 7.4, 8.1-8.2 MML Explore 7.4, 8.1-8.2 MML Hwk 7.4, 8.1-8.2 MML Quiz 7 – Chapter 7 **Due 11:59pm, 11/11**
Week 12 11/12-11/18	**Hypothesis Testing with Two Samples (Part 2) & Correlation and Regression (Part 1)** • 8.3 – Testing the Difference Between Means (Dependent Samples) • 8.4 – Testing the Difference Between Proportions • 9.1 – Correlation	Read Sections 8.3-8.4, 9.1 MML Explore 8.3-8.4, 9.1 MML Hwk 8.3-8.4, 9.1 MML Quiz 8 – Chapter 8 Discussion 5 – What Kind of Test is This? **Due 11:59pm, 11/18**
Week 13 11/19-11/25	**Correlation and Regression (Part 2) & Thanksgiving Holiday** • 9.2 – Linear Regression • **11/21-11/23 – Thanksgiving Holidays – No Classes!**	Read Section 9.2 MML Explore 9.2 MML Hwk 9.2 **Due 11:59pm, 11/25**
Week 14 11/26-12/2	**Correlation and Regression (Part 3) & Cumulative Project** • 9.3 – Measures of Regression and Prediction Intervals • **Cumulative Project (Due 11:59pm, 12/9)**	Read Sections 9.3 MML Explore 9.3 MML Hwk 9.3 MML Quiz 9 – Chapter 9 **Due 11:59pm, 12/2**
Week 15 12/3-12/9	**Analysis of Variance & Review for Final Exam** • 10.4 – Analysis of Variance • Review for Final Exam	Read Section 10.4 MML Explore 10.4 MML Hwk 10.4 MML Review Quiz (Chapters 6-10) MML Review Hwk **Due 11:59pm, 12/10**
Week 16 12/10-12/13	**Final Exam** • **Final Exam** (Chapters 6-10)	

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