CASPER COLLEGE COURSE SYLLABUS
STAT2050-02
Fundamentals of Statistics

Semester/Year: Spring 2016
Lecture Hours: 0  Lab Hours: 0  Credit Hours: 5
Class Time: NA  Days: NA  Room: NA
Instructor's Name: Ashley Johnson
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Email: ashley.johnson@caspercollege.edu
Office Hours: Monday 9:00 – 9:50 and 2:00 – 2:50  Tuesday 12:00 – 12:50
Wednesday 2:00 – 2:50  Thursday 9:00 – 9:50 and 12:00 – 12:50

Course Description: Fundamentals of Statistics is primarily for the students of the life sciences, behavioral sciences, and physical sciences. Topics include frequency distributions and graphics, central tendency, dispersion, useful probability models, and basic statistical inference including linear regression and correlation.

Statement of Prerequisite: A grade of "C" or better in MATH 1000 or MATH 1400, or an ACT Math score of 23 or better, or an appropriate COMPASS Exam score within the past year.

Goal: The goal of this course is to gain a working knowledge of the vocabulary, uses, and misuses of basic classical descriptive and inferential statistics. Using Stata, students will be able to identify the necessary calculator steps, correctly input data/statistics, and reach conclusions. Students will be able to explain their methodology and effectively communicate the meaning of their conclusions.

Methodology: Given that this is an online course, you yourself are responsible for learning the course content. This is not a self-paced course so you will be expected to keep up with weekly material and assignments. Your goal when learning the material should be with the intent to understand and not to “just get by” on the tests. If you do not understand something, please contact me! While the primarily responsibility for an online course is on the student, my role is to facilitate success as a resource for you.

Casper College General Education Outcome(s):

• Use the scientific method
• Use quantitative analytical skills to evaluate and process numerical data
Casper College may collect samples of student work demonstrating achievement of the above outcomes. Any personally identifying information will be removed from student work.

**Course Objectives:**
The students will be able to:
- Obtain and interpret summary statistics and graphics
- Verify the assumptions of Normality and equality of variance (EOV)
- Compute probabilities from a sample space and population distribution
- Set up interval estimates for population parameters
- Run hypothesis tests for 1 and 2 variable situations and interpret the results
- Perform the appropriate Post Hoc test(s) when necessary
- Perform a 1 variable Linear Regression, including a test on significance
- Perform a one way analysis of variance (ANOVA), including the overall F test
- Set up and run simple Goodness-of-Fit hypothesis tests

**Required Course Materials:**
**Stata:** Stata is statistical analysis software that will be used together with the calculator to calculate summary statistics, create graphics, and perform statistical tests. It will be used primarily outside of class and will be required for Lab Activity assignments. A six month subscription is $38.

**Recommended Text:** Any edition of *Elemental Statistics* by Mario F. Triola

**Grading:**
**15% Learning Quizzes:** A learning quiz will be due every Monday at 11:59 pm unless there is a test that week. It will include all of the material covered that week. You are expected to work alone on the Learning Quizzes by may ask your instructor questions. The lowest Learning Quiz will be dropped.

**15% Lab Activities:** For each of the five units, there will be several assignments that will help to both practice and explore the in-class material at a more detailed level. Due dates for the assignment will be at the end of the day (11:59 pm) on the date specified on each assignment. The lowest assignment will be dropped at the end of the semester. No late assignments will be accepted for any reason.

**40% Tests:** There will be a proctored exam after each of the first four units. You may use a single sheet of paper with hand written notes on each test. Additionally, for the Unit 3 exam, you may use the “Confidence Interval Reference Tables” and for the Unit 4 exam, you may use the “Hypothesis Test Reference Tables.” All pages used on the exam must be turned in with the exam and must be unique to each student. Those students who live in Casper will take their exams at the
Casper College Academic Testing Center. Those who do not live in Casper will need to locate and use an approved proctoring center with the help from the Casper College Testing Center.

15% Final Exam: There will be a mostly cumulative final exam during the final exam period. You may use a single sheet of handwritten notes on the exam as well as the reference tables for confidence intervals and hypothesis testing. Like the other exams, this exam must be proctored.

15% Project: You will be required to do a project where you collect data to answer a question of interest to you. The data analysis will need to include some of the descriptive and inferential statistical techniques that we will learn this semester. The project will be presented as a poster and presented in a recorded video at the end of the semester. The project description and the grading rubric will be on Moodle.

Late Assignments: No assignment will be accepted late for any reason. Missing class is never a legitimate reason for attempting to turn in an assignment late.

Grading Scale: The traditional percentage grading scale of 90% A - 80% B - 70% C - 60% D will be used. However, I reserve the right to lower the grade cutoffs.

Class Policies: The last date to change to audit status or to withdraw with a W Grade is April 14th.

Student Rights and Responsibilities: Please refer to the Casper College Student Conduct and Judicial Code for information concerning your rights and responsibilities as a Casper College Student.

Chain of Command: If you have any problems with this class, you should first contact the instructor to attempt to solve the problem. If you are not satisfied with the solution offered by the instructor, you should then take the matter through the appropriate chain of command starting with the Department Head/Program Director, the Dean, and lastly the Vice President for Academic Affairs.

Academic Dishonesty: (Cheating & Plagiarism) Casper College demands intellectual honesty. Proven plagiarism or any form of dishonesty associated with the academic process can result in the offender failing the course in which the offense was committed or expulsion from school. See the Casper College Student Code of Conduct for more information on this topic.
**Official Means of Communication:** Casper College faculty and staff will employ the student's assigned Casper College email account as a primary method of communication. Students are responsible to check their account regularly. This is also, where you will find course evaluation links during course evaluation periods.

**ADA Accommodations Policy:** If you need academic accommodations because of a disability, please inform me as soon as possible. See me privately after class, or during my office hours. To request academic accommodations, students must first consult with the college’s Disability Services Counselor located in the Gateway Building, Room 344, (307) 268-2557, bheuer@caspercollege.edu. The Disability Services Counselor is responsible for reviewing documentation provided by students requesting accommodations, determining eligibility for accommodations, and helping students request and use appropriate accommodations.

**Course Schedule:**

- **Unit 1** – 3 weeks; Types of data and studies, sampling methods, visual representations of data, measures of center, measures of variation, measures of relative standing, descriptive statistics, normality test
- **Unit 2** – 2.5 weeks; Probability, the binomial distribution
- **Unit 3** – 3 weeks; The uniform distribution, normal distribution, percentiles, the central limit theorem, confidence intervals, sample size determination
- **Unit 4** – 4.5 weeks; Traditional hypothesis testing
- **Unit 5** – 2 weeks; More hypothesis tests: Goodness of fit, the test for independence, correlation and regression, scatterplots, the analysis of variance (ANOVA)
Unit 1
The Foundation of Statistics

Topic 1: Introduction to Statistics
Topic 2: Types of Data
Topic 3: Sampling Methods
Topic 4: Observational Studies versus Experiments
Topic 5: Statistical Graphics
Topic 6: Frequency Distributions
Topic 7: Histograms
Topic 8: Measures of Center
Topic 9: Measures of Variation
Topic 10: Measures of Relative Standing
Topic 11: Assessing Normality (“light”)

Unit 2
Probability: An important component of Statistics

Topic 1: The Basics of Probability
Topic 2: The Addition Rule of Probability
Topic 3: The Multiplication Rule of Probability
Topic 4: The Multiplication Rule with Complements
Topic 5: Probability Distributions
Topic 6: The Binomial Distribution Part 1
Topic 7: The Binomial Distribution Part 2
Unit 3
Continuous Distributions and Introduction to Inferential Statistics

Topic 1: The Uniform Distribution
Topic 2: The Standard Normal Distribution
Topic 3: Applications of the Normal Distribution
Topic 4: The Central Limit Theorem
Topic 5: Introduction to Confidence Intervals
Topic 6: Confidence Intervals for a Population Proportion
Topic 7: Confidence Intervals for a Population Mean
Topic 8: Confidence Intervals for a Population Standard Deviation
Topic 9: Estimating Sample Sizes Required for Desired Accuracy

Hypothesis Testing – The Heart of Statistics

Unit 4
Traditional Hypothesis Tests

Topic 1: Introduction to Hypothesis Testing
Topic 2: Testing a Claim on a Population Mean
Topic 3: Testing a Claim on a Population Proportion
Topic 4: Testing a Claim on a Population Standard Deviation
Topic 5: Testing a Claim on 2 Population Standard Deviations
Topic 6: Testing a Claim on 2 Population Means
Topic 7: Testing a Claim on 2 Population Proportions
Topic 8: Testing a Claim on Paired Data

Unit 5
Regression and Non-traditional Hypothesis Tests

Topic 1: Testing a Claim on More than 2 Proportions
Topic 2: Testing a Claim on the Relationship between 2 Categorical Variables
Topic 3: Regression
Topic 4: Testing a Claim on More than 2 means