MAT161 40 C – ELEMENTARY STATISTICS

CONTACT HOURS: 3

SEMESTER AND YEAR: Fall 2011

CREDIT HOURS: 3

INSTRUCTOR: Ms. Mary Clackler
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Help given by appointment

I. COURSE DESCRIPTION:

This course is a study of basic statistical techniques and some related probability theory. Course topics include data collection and presentation, measures of central tendency and dispersion, grouping and graphing data sets, linear correlation and regression, sampling distributions, estimation, and hypothesis testing. Distribution studies include the binomial, normal, and student 's *t*. At least one student project is required for this course. The use of a graphing calculator is required for this course to further the exploration of these topics and their applications.

This course meets the SUNY General Education course requirements for mathematics.

II. PREREQUISITE: MAT101 or higher or equivalent

III. COURSE OBJECTIVES, SUNY GENERAL EDUCATION KNOWLEDGE AREA LEARNING OUTCOMES AND ASSESSMENT:

COURSE OBJECTIVES:
As the result of instructional activities, students will be able to:
1. Distinguish between a population and a sample
2. Distinguish between descriptive statistics and inferential statistics
3. Distinguish between different types of variables (continuous quantitative, discrete quantitative, nominal qualitative, and ordinal qualitative)
4. Distinguish between observational studies and experiments
5. Distinguish between different types of sampling designs (voluntary response, convenience, simple random and stratified random
6. Design an experiment using randomization, replication and control of extraneous variables
7. Choose and draw appropriate graphs for data sets
8. Identify outliers in data sets
9. Explain the effects of outliers
10. Identify the shape of a distribution
11. Choose, calculate and interpret appropriate numerical summaries of center, spread and position for one-variable data sets
12. Distinguish between predictor and response variable
13. Draw a scatter plot
14. Determine whether or not linear regression is appropriate for a data set
15. Calculate and interpret the correlation coefficient
16. Write the equation of a regression line
17. Use a regression equation to make predictions

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18. Calculate and interpret the coefficient of determination
19. Calculate probabilities using basic rules of probability
20. Construct the probability distribution for a discrete random variable
21. Identify the attributes of the normal distribution
22. Find probabilities associated with the standard normal distribution
23. Calculate z-scores
24. Use standardization to find proportions/percents/probabilities associated with a normal distribution
25. Use un-standardization to find the value of a variable associated with a given proportion/percent/probability
26. Describe the sampling distribution of the sample mean (including center, spread and shape)
27. Explain the Central Limit Theorem
28. Calculate probabilities associated with the sampling distribution of the sample mean
29. Identify the requirements that must be met in order to use the one sample z procedure to construct a confidence interval or perform a hypothesis test
30. Construct and interpret a confidence interval to estimate a population mean
31. Explain the effects of changes in confidence level and sample size of a confidence interval
32. State the null and alternative hypothesis for a hypothesis test
33. Calculate the value of a test statistic
34. Calculate the p-value
35. Make a decision and conclusion for a hypothesis test (based on a p-value)
36. Explain the meaning of a Type I Error and a Type II Error

SUNY GENERAL EDUCATION KNOWLEDGE AREA LEARNING OUTCOMES:
Students will demonstrate the ability to:
1. interpret and draw inferences from mathematical models such as formulas, graphs, tables and schematics;
2. represent mathematical information symbolically, visually, numerically and verbally;
3. use arithmetical, algebraic, geometric and statistical methods to solve problems;
4. estimate and check mathematical results for reasonableness, determine alternatives and select optimal results; and
5. recognize the limits of mathematical and statistical methods.

ASSSESSMENT: There will be 2 major chapter exams during the semester and some problems of the week that cover the material from the last class. There will also be two projects that may take a couple of weeks to complete. A comprehensive final exam will be given.

IV. REQUIRED TEXTBOOK AND MATERIALS:

REQUIRED TEXTBOOK:
Fundamentals of Statistics, 3nd edition; Sullivan. Prentice Hall. ISBN #978-0-321-64187-8

REQUIRED MATERIALS:
A graphing calculator (the TI-83, TI-83 Plus, TI-84 Plus, or TI-NSpire are strongly recommended)**,** OR another approved calculator whish has functions for one and two variable statistics including the correlation coefficient and the slope and intercept of the least squares regression line (such as a TI-36X Solar). Each student is expected to have their own calculator. You will not be allowed to share a calculator on an exam.

V. METHODS OF INSTRUCTION/COURSE ORGANIZATION:

The method of instruction will include lectures some include PowerPoint presentations, Smart Board activities, classroom discussions, and review exercises from the previous class. Homework exercises will include textbook problems to be completed between classes as well as long term projects to be completed over a course of several weeks. There may also be internet projects using real time data if time allows.

VI. ATTENDANCE PROCEDURE (INCLUDING MAKEUP POLICY):

Students are expected to attend **ALL** classes unless there are extenuating circumstances that warrant an excused absence. **Please leave a message or e-mail if you are unable to attend. If you miss a class, you are responsible for obtaining any missed assignments from the class and completing the assignment by the due date.** This course will have two chapter exams. Students are responsible for knowing when each exam will be given and for being present on those days. If you miss an exam, your grade will be recorded as a zero: **I DO NOT GIVE MAKE-UP EXAMS**. After final exams are given I will replace your lowest test score with the percentage on your final exam provided it will help your grade. I do not give makeup exams, however, I replace your lowest test score with the final exam percentage if you miss ONE exam then that will be the exam that is replaced by the final exam percentage. If you miss two exams I will expect verifiable proof of very good reasons (my call on what is very good) for BOTH exams. If you provide such proof we will take care of the second missed exam at that point.

As per college policy, any student who misses more than 15% of he class sessions may be involuntarily withdraw from class. In such cases a grade of "W" will be received. If you arrive to class after I have taken attendance, you must inform me after class so that I can adjust the entry in my online attendance book. If you only attend class for half of the allotted time, you will receive half an absence for that day. Also note that three occurrences of arriving late to class will count as one absence. It is your responsibility for keeping track of the number of absences you have. The last day to withdraw from the class with a grade of "W" is the end of the tenth week of the semester.

VII. BIBLIOGRAPHY OF READINGS :(NOT APPLICABLE)

VIII. METHODS OF EVALUATION

Students will be evaluated using the following categories of assignments and the final grade calculated using the percentages following.

>   Homework Assignments and some In-Class Problems;
>   2 Statistical Projects;
>   2 exams given during the course of the semester;
>   1 cumulative final exam.

Grades will be computed according to the following formula:

Exam Average	= 40%
Projects	= 20%
Homework/Class problems	= 20%
Final Exam	= 20%

IX. GRADING SCALE:
Final grades will be computed by the above percentages and converted to a letter grade using the following guideline.

Average Percentage	Final Letter Grade	Average Percentage	Final Letter Grade
93 % and above	A	77% to 79%	C+
90% to 92%	A-	73% to 76%	C
87% to 89%	B+	70% to 72%	C-
83% to 86%	B	67% to 69%	D+
80% to 82%	B-	60% to 66%	D
		Below 60%	F

W   Withdrawal
WY   Involuntary Withdrawal

If you have, or suspect you may have, any type of disability or learning problem that may require extra assistance or special accommodations, please speak to me privately after class or during my office hours as soon as possible so I can help you obtain any assistance you may need to successfully complete this course. You should also contact the Academic Assistance Center, for further assistance.

X. GENERAL TOPICS OUTLINE:
I.   Introduction to Statistics (textbook chapter 1)
        including population, sample, and types of variables
II.   Data Collection (textbook chapter 1)
        including sampling, observational studies, and experiments
III.   Descriptive Statistics for One-Variable Data (textbook chapters 2 and 3)
        including graphing and measures of center, spread, and position
IV.   Descriptive Statistics for Two-Variable Data (textbook chapter 4)
        including scatter plots, linear correlation, and regression
        *********Exam 1***************
V.   Probability (textbook chapter 5)
VI.   Probability Distributions for Discrete Random Variables (textbook chapter 6)
VII.   Probability Distributions for Continuous Random Variables (textbook chapter 7)
        including the normal distribution
VIII.   Sampling Distributions (textbook chapter 8)
        including the Central Limit Theorem
        *********Exam 2***************
IX.   Inferential Statistics (textbook chapters 9 and 10)
        including estimation and hypothesis testing

XI. ACADEMIC INTEGRITY:
Academic honesty is expected of all Clinton Community College students. It is academically dishonest, for example, to misrepresent another person's work as one's own, to take credit for someone else's work or ideas, to accept help on a test, to obtain advanced information on confidential test materials, or to intentionally harm another student's chances for academic success. When an instructor believes that a student has failed to maintain academic honesty, he or she may give the students an F, either for the assignment or for the course, depending on the severity of the offense. In case of such an offense, the instructor will notify, in writing, the student and the Academic Dean. A student may appeal a decision on the charge of failing to maintain academic honesty according to the procedure prescribed by the Student Code of Conduct in the College catalog.