

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number: MAT 115H Department: Mathematics

Course Title: Honors Statistics Semester: Fall Year: 2016

Objectives/Competencies

Course Objective	Competencies
<p>The objective of this course is to have the student develop an understanding of, and computational skill with, the basic techniques, language, and logic of Statistics and Quality Control. The student will demonstrate the ability to gather, display and interpret data and perform a hypothesis test.</p> <p>1. Organizing data.</p> <p>2. Averages and variation.</p>	<p>1. Define and explain the terms and concepts of populations, sample and types of sampling strategies, and data types.</p> <p>2. Create and interpret the various types of charts and graphs.</p> <p>3. Create and interpret frequency, relative frequency and cumulative frequency distributions.</p> <p>1. Understand the concept of central tendency.</p> <p>2. Understand the concept of variation and Chebychev's theorem.</p> <p>3. Define, find and use appropriately the measures mode, median, mean, standard deviation, variance, range, quartile, and percentile for populations or samples and for</p>

Course Objective	Competencies
3. Regression and Correlation.	<p>raw or grouped data.</p> <ol style="list-style-type: none"> 1. Define and be able to understand the appropriate use of regression and correlation.
4. Elementary probability theory.	<ol style="list-style-type: none"> 1. Use the basic ideas and formulas of Classical Probability for simple and compound events. 2. Use basic counting techniques-multiplication rule, permutations, combinations.
5. Discrete probability distributions	<ol style="list-style-type: none"> 1. Define and understand the concept of a random variable. 2. Create a probability distribution for a discrete random variable. 3. Find the mean (expected value) and standard deviation of a random variable. 4. Find probabilities using the binomial distribution. 5. Use the geometric and Poisson distributions.
6. Normal distributions.	<ol style="list-style-type: none"> 1. Create and interpret control charts. 2. Know the characteristics of the normal distribution. 3. Find and utilize probabilities using the normal distribution.
7. Introduction to sampling distributions.	<ol style="list-style-type: none"> 1. Know and be able to apply the central limit theorem. 2. Find probabilities using a sampling distribution.
8. Introduction to estimation.	<ol style="list-style-type: none"> 1. Find and interpret confidence intervals for the population

Course Objective	Competencies
<p>9. Hypothesis testing involving one population.</p>	<p>mean and population proportions.</p> <ol style="list-style-type: none"> 1. Know all the terminology of hypothesis testing. 2. Understand the process and logic of hypothesis testing. 3. Utilize hypothesis tests in research situations to test hypotheses about population means. 4. Utilize hypothesis tests in research situations to test hypotheses about population proportions.
<p>10. Correlation and Linear regression</p>	<ol style="list-style-type: none"> 1. Create and interpret scatterplots of two-variables statistics. 2. Calculate, using technology, the correlation coefficient in a set of two-variable data. 3. Determine and use the regression equation for linear relationships. 4. Discuss non-linear relationships.

Course Objective	Competencies
11. Investigate a topic using an interdisciplinary approach.	<ol style="list-style-type: none"> 1. Student demonstrates ability to evaluate an appropriate topic for a statistical study. 2. Student uses ability to analyze a topic and draw conclusions from the data about the population as well as the research methods themselves.
12. Conduct independent scholarly research.	<ol style="list-style-type: none"> 1. Student demonstrates a strong knowledge of the statistical research process. 2. Student demonstrates familiarity with appropriate methods and sources for research, including the library, the Internet, as well as other appropriate sources.
13. Synthesize information from various sources.	<ol style="list-style-type: none"> 1. Student demonstrates ability to compile statistical research material. 2. Student demonstrates ability to evaluate statistical research materials as well as the results gleaned from analyzing the data. 3. Student demonstrates ability to apply in writing and discussions information acquired through research and other methods.
14. Development of critical thinking skills appropriate to an Honors Course.	<ol style="list-style-type: none"> 1. Student uses clear logical patterns of thinking, argumentation, and questioning. 2. Student is able to discern different points of view and critique the validity of the results of statistical research.