Introduction to Statistics
MATH158
Spring 2016

This course provides a basic introduction to statistics. It is recommended for students in business, social science, human resources, allied health, and criminal justice and provides an excellent preparation for any career. Topics include descriptive statistics, probability, probability distributions, the normal distribution, hypothesis testing, estimates and sample sizes, the chi square distribution, correlation, and regression. Prerequisite: D- or higher in MATH003 Preparation for College Math III or MATH012 Intermediate Algebra or a score of 72 or higher on mathematics placement testing results, and ENGL092 Preparing for College Reading II; or departmental approval.

COURSE OUTCOMES	OUTCOMES ACTIVITIES
At the end of this course, students will be able to	
Understand and be able to use the basic definitions and rules of descriptive statistics in order to apply them later in this course and in the real world.	1. Draw and interpret histograms, circle graphs, and box-and-whisker plots. (CT,QS,R,TS) 2. OPTIONAL: Draw and interpret frequency polygons, dot plots and stem-and-leaf plots. (CT,QS,R,TS) 3. Find the mean, median, mode, range, and standard deviation of ungrouped data. (CT,QS,R,TS) 4. Summarize data using frequency tables. (CT,QS,R,TS) 5. Find the mean from a frequency table. (CT,QS,R,TS) 6. OPTIONAL: Find the standard deviation from a frequency table. (CT,QS,R,TS) 7. Find percentiles and quartiles. (CT,QS,R,TS) 8. OPTIONAL: Find Deciles. (CT,QS,R,TS)
Use the rules of basic probability in order to solve related problems.	1. Apply the basic concepts of probability including the addition and multiplication rules. (CT,QS,R,TS) 2. Find conditional probabilities. (CT,QS,R,TS) 3. Find probabilities from contingency tables. (CT,QS,R,TS)

Identify and use the rules for probability distributions in order to solve related problems.	1. Determine if a given set of circumstances satisfies the requirements of a probability distribution. (CT,QS,R,TS)
	2. Find the mean, standard deviation, and expected value for a probability distribution. (CT,QS,R,TS)
	3. Know when to use the binomial distribution. (CT,QS,R,TS)
	4. Find the probability of an event, the mean, and the standard deviation given a binomial distribution. (CT,QS,R,TS)
	5. Solve problems involving the normal distribution. (CT,QS,R,TS)
	   a. Find z-scores.
	   b. Find probabilities.
	   c. Find the data value for a given probability.
	   d. Apply the Central Limit Theorem.
	   e. OPTIONAL: Use a normal approximation to the binomial distribution.

Determine how effective sample data is in estimating the value of a population parameter.	1. Calculate the confidence interval for the mean with large and small samples. (CT,QS,R,TS)

	2. Calculate the confidence interval for proportions. (CT,QS,R,TS)
	3. OPTIONAL: Calculate the confidence interval for standard deviation or variance. (CT,QS,R,TS)
	4. Calculate sample size for means and proportions. (CT,QS,R,TS)
Use the standard procedures involved in hypothesis testing in order to determine if a claim is supported by the sample data.	1. Apply tests involving the mean with large and small samples. (CT,QS,R,TS)
	2. Apply tests involving a proportion. (CT,QS,R,TS)
	3. Use p-values to determine if the null hypothesis should be rejected. (CT,QS,R,TS)
Solve problems involving linear correlation and regression in order to determine whether there is a relationship between two sets of data and, if so, to identify what the relationship is.	1. Calculate a linear correlation coefficient. (CT,QS,R,TS)
	2. Find the least square regression line and use it to predict values. (CT,QS,R,TS)
Apply the χ^2-distribution in order to solve related problems.	The course must include at least one of the following:
	1. Determine Goodness-of-Fit. (CT,QS,R)
	2. Determine independence of events from contingency tables. (CT, QS, R)
	3. Calculate the confidence intervals for standard deviation or variance. (CT,QS,R,TS)
	4. Apply tests involving a standard deviation or variance. (CT,QS,R,TS)
Strengthen Core Competencies** in order to increase success in this and other courses and in the workplace.	Referenced above

**Indicate the Core Competencies that apply to the outcomes activities and assessment tools: Critical Thinking (CT); Technology Skills (TS); Oral Communications (OC); Quantitative Skills (QS); Reading (R); Writing (W).