

**Course Title & Number:** MAT\*H167 Principles of Statistics

**Competency Area:** **QUANTITATIVE REASONING** (Goal: Students will learn to recognize, understand, and use the quantitative elements they encounter in various aspects of their lives. Students will develop a habit of mind that uses quantitative skills to solve problems and make informed decisions.)

**Faculty submitting the Learning Outcomes:** Jane Wampler, Harry Burt, Ruth Urbina-Lilback, Katie Lozo

**Date:** 3/7/13

**[Instructions:** *Please match the Learning Outcomes in the left hand column to those of the course you are submitting for Gen Ed approval. List the corresponding course outcomes in the right hand column to indicate a match.]*

| BOR TAP's Learning Outcomes  | Corresponding Outcomes for Course Named Above  |
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| 1. Represent mathematical and quantitative information symbolically, graphically, numerically, and verbally. | A2. Graphically represent data in a variety of formats - bar graphs, dot plots, frequency distribution histogram.<br>A3. Calculate and distinguish the measures of central tendency – mean, median, mode and midrange – for both grouped and ungrouped data.<br>A4. Calculate and distinguish the measures of variation - range, standard deviation and variance - for both grouped and ungrouped data.<br>A5. Calculate and interpret the values determined for quartiles, percentiles and standard score.<br>A6. Use the mean and standard deviation for a set of data to determine information about the proportion of data from applying Chebyshev's Theorem and/or the Empirical Rule for normal distributions.<br>A7. Draw a scattergram for bivariate data and determine and interpret the value of the linear correlation coefficient for that data.<br>A8. Determine the linear relationship for bivariate data through a regression analysis and determine the line of best fit for that data.<br>B4. Recognize a probability distribution when presented in a tabular or algebraic fashion and be able to calculate the mean and standard deviation as well as be able to draw a histogram for such a probability distribution.<br>D1. Determine and interpret a confidence interval estimate for the population mean when the population standard deviation is known.<br>D4. Complete a test of hypothesis relative to a population mean (standard deviation known) and state a meaningful conclusion for that |

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|  | <p>testing.</p> <p>D6. Use the student t distribution to determine and interpret a confidence interval estimate for the population mean when the population standard deviation is unknown.</p> <p>D7. Use the student t distribution to complete a test of hypothesis for the population mean when the population standard deviation is unknown.</p>   |
| <p>2. Apply quantitative methods to investigate routine and novel problems. This includes calculations/procedures, mathematical and/or statistical modeling, prediction, and evaluation.</p> | <p>A2. Graphically represent data in a variety of formats - bar graphs, dot plots, frequency distribution histogram.</p> <p>A3. Calculate and distinguish the measures of central tendency – mean, median, mode and midrange – for both grouped and ungrouped data.</p> <p>A4. Calculate and distinguish the measures of variation - range, standard deviation and variance - for both grouped and ungrouped data.</p> <p>A5. Calculate and interpret the values determined for quartiles, percentiles and standard score.</p> <p>A6. Use the mean and standard deviation for a set of data to determine information about the proportion of data from applying Chebyshev's Theorem and/or the Empirical Rule for normal distributions.</p> <p>A7. Draw a scattergram for bivariate data and determine and interpret the value of the linear correlation coefficient for that data.</p> <p>A8. Determine the linear relationship for bivariate data through a regression analysis and determine the line of best fit for that data.</p> <p>B2. Determine a simple probability using the relative frequency definition applied to the entire set of outcomes.</p> <p>B3. Apply the basic rules of probability to determine the probabilities for compound events especially in the case where the set of all possible outcomes is presented in a tabular format.</p> <p>B4. Recognize a probability distribution when presented in a tabular or algebraic fashion and be able to calculate the mean and standard deviation as well as be able to draw a histogram for such a probability distribution.</p> <p>B5. Recognize a binomial probability experiment and be able to calculate the probability in any situation of this type.</p> <p>B6. Determine a probability for the standard normal distribution.</p> <p>B7. Determine a standard score when a specific probability is given for</p> |

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|   | <p>the standard normal distribution.</p> <p>B8. Apply the standard normal distribution to determine probabilities and/or specific values for any normal distribution.</p> <p>C1. Show an understanding of the concept of a sampling distribution with emphasis on the sampling distribution of sample means and the conclusions drawn for it by the Central Limit Theorem.</p> <p>C2. Use the conclusions of the Central Limit Theorem to determine probabilities involving the sample mean.</p> <p>D1. Determine and interpret a confidence interval estimate for the population mean when the population standard deviation is known.</p> <p>D2. Determine the sample size to estimate the population mean (standard deviation known) within a certain level of accuracy.</p> <p>D4. Complete a test of hypothesis relative to a population mean (standard deviation known) and state a meaningful conclusion for that testing.</p> <p>D5. Determine a probability for the student t distribution.</p> <p>D6. Use the student t distribution to determine and interpret a confidence interval estimate for the population mean when the population standard deviation is unknown.</p> <p>D7. Use the student t distribution to complete a test of hypothesis for the population mean when the population standard deviation is unknown.</p> |
| <p>3. Interpret mathematical and quantitative information and draw logical inferences from representations such as formulas, equations, graphs, tables, and schematics.</p> | <p>A2. Graphically represent data in a variety of formats - bar graphs, dot plots, frequency distribution histogram.</p> <p>A3. Calculate and distinguish the measures of central tendency – mean, median, mode and midrange – for both grouped and ungrouped data.</p> <p>A4. Calculate and distinguish the measures of variation - range, standard deviation and variance - for both grouped and ungrouped data.</p> <p>A5. Calculate and interpret the values determined for quartiles, percentiles and standard score.</p> <p>A6. Use the mean and standard deviation for a set of data to determine information about the proportion of data from applying Chebyshev's Theorem and/or the Empirical Rule for normal distributions.</p> <p>A7. Draw a scattergram for bivariate data and determine and interpret the value of the linear correlation coefficient for that data.</p>   |

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|  | <p>A8. Determine the linear relationship for bivariate data through a regression analysis and determine the line of best fit for that data.</p> <p>B2. Determine a simple probability using the relative frequency definition applied to the entire set of outcomes.</p> <p>B3. Apply the basic rules of probability to determine the probabilities for compound events especially in the case where the set of all possible outcomes is presented in a tabular format.</p> <p>B4. Recognize a probability distribution when presented in a tabular or algebraic fashion and be able to calculate the mean and standard deviation as well as be able to draw a histogram for such a probability distribution.</p> <p>B5. Recognize a binomial probability experiment and be able to calculate the probability in any situation of this type.</p> <p>C1. Show an understanding of the concept of a sampling distribution with emphasis on the sampling distribution of sample means and the conclusions drawn for it by the Central Limit Theorem.</p> <p>C2. Use the conclusions of the Central Limit Theorem to determine probabilities involving the sample mean.</p> <p>D1. Determine and interpret a confidence interval estimate for the population mean when the population standard deviation is known.</p> <p>D4. Complete a test of hypothesis relative to a population mean (standard deviation known) and state a meaningful conclusion for that testing.</p> <p>D6. Use the student t distribution to determine and interpret a confidence interval estimate for the population mean when the population standard deviation is unknown.</p> <p>D7. Use the student t distribution to complete a test of hypothesis for the population mean when the population standard deviation is unknown.</p> |
| 4. Evaluate the results obtained from quantitative methods for accuracy and/or reasonableness. | Evaluate the results obtained from quantitative methods for accuracy and/or reasonableness.   |
|  | <b><i>Additional Outcomes</i></b>   |

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|  | <p>A1. Show a basic understanding of the terminology used in the interpretation of statistics.</p> <p>B1. Distinguish between empirical and theoretical probability and be able to represent all of the outcomes in either case.</p> <p>D3. Exhibit an understanding of the steps involved and the conclusion reached in a test of a statistical hypothesis.</p> |
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