ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

COMMON COURSE OUTLINE

Course discipline/number/title: MATH 2208: Fundamentals of Statistics

A. CATALOG DESCRIPTION
1. Credits: 4
2. Hours/Week: 4
3. Prerequisites (Course discipline/number): MATH 0099 or MATH 0100 or MATH 1111
4. Other requirements: None
5. MnTC Goals (if any): Goal 4/Mathematical/Logical Reasoning

B. COURSE DESCRIPTION: This course is an introduction and overview of math statistics. Topics will include (but not limited to) descriptive statistics, probability and hypothesis testing. Computers and graphics calculators will be used extensively throughout the class in the classroom and computer lab setting. College level reading skills as demonstrated by completion of READ 0900 or equivalent placement score.

C. DATE LAST REVISED (Month, year): February, 2020

D. OUTLINE OF MAJOR CONTENT AREAS:
1. Statistical terminology, types of data, and types of sampling.
2. Summarizing data using tables, histograms or other graphical devices.
3. Measures of central tendency, variation or dispersion, and position. (Mean, median, mode, variance, standard deviation, z-scores, and percentile, etc.)
4. Shape of distributions in general or based on sample data and summary statistics.
5. Probability and probability distributions including normal, binomial, and uniform.
6. Expected value, mean, variance, standard deviation and standard error for specific distributions.
7. Central limit theorem and its applications.
8. Confidence intervals for the population mean(s), proportion(s), standard deviation(s), or variance(s) regarding independent or dependent samples when applicable.
9. One and two sample hypothesis testing for the mean(s), proportion(s), standard deviation(s), or variance(s) using z, t, Chi-square, and F tests, and using the traditional method and/or p-value method.
10. Correlation coefficient, regression line, and hypothesis testing regarding positive, negative, or no significant linear correlation between bivariate data x and y.
11. Analysis of variance (ANOVA): One-way.
12. Additional topics may include Two-way ANOVA and/or nonparametric tests, etc.

E. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Understand and apply statistical terminology, identify types of data and sampling.
2. Summarize and interpret data using a variety of techniques and graphical devices.
3. Calculate and interpret measures of center, variation or dispersion, position and determine the general shape if the distribution when given data or other information.
4. Calculate and interpret probabilities and expected values.
5. Calculate and interpret confidence intervals.
6. Select the appropriate hypothesis test on a given data set and draw a conclusion from the resulting test statistic using the traditional and/or p-value methods.
7. Calculate and interpret the correlation coefficient and regression line equation for a given data set and make predictions.
8. Determine and use the appropriate parametric vs. a non-parametric test for a given data set.
9. Perform the above computationally using formulas, tables, and/or using a graphing calculator or statistical software on the computer when applicable.
10. Accurately analyze and interpret computational work, calculator output, and computer printouts when applicable.

F. LEARNING OUTCOMES (MNTC):
Goal 4/Mathematics/Symbolic Systems: The student will be able to:
1. Illustrate historical and contemporary applications of mathematics/logical systems.
2. Clearly express mathematical/logical ideas in writing.
3. Explain what constitutes a valid mathematical/logical argument (proof).

F. LEARNING OUTCOMES (MNTC): Continued. . .
4. Apply higher-order problem solving and/or modeling strategies.

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:
1. Exams
2. Homework
3. Quizzes
4. Computer Labs
5. Activities
6. Projects
7. Comprehensive Final Exam

H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s): Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

I. SPECIAL INFORMATION (if any):
1. A graphing calculator is required (Texas Instrument (TI) is recommended and supported).