NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE

COURSE SYLLABUS

Course Title: Principles of Statistics   **Course #** MAT*167

Course Description: 3 credits
This course covers basic concepts used in collecting, presenting and analyzing data, descriptive statistics, probability distributions, sampling theory, statistical inference to include hypothesis testing, regression and correlation. ***The use of a graphing calculator (TI-83/84 or TI-83/84Plus) is highly recommended and Microsoft Excel is required.***

Pre-Requisite/Co-Requisite: C or better in MATH 137, 137X or equivalent

Goals:
The student should develop an understanding of the basic concepts used in statistics and acquire the techniques used to apply these basic concepts to picture and describe the world.

Outcomes:
Upon successful completion of this course, each student must have demonstrated understanding and competency in each of the following topics and techniques (through in-class testing of each individual student independently):

1. Identify various types of qualitative and quantitative data.

2. Identify various types of experimentation and sampling techniques and samples vs populations.

3. Create relative and cumulative frequency distributions.

4. Identify and create statistical graphs including frequency polygons, pareto charts, dot plots, stem and leaf plots, pie charts, and scatter plots.

5. Calculate measures of center (mean, median, mode, midrange).

6. Calculate measures of variation (range, variance, standard deviation).

7. Calculate measures of relative standing (z-scores, quartiles, percentiles).

8. Utilize the Empirical Rule for data with a bell-shaped distribution.

9. Calculate theoretical and empirical probabilities, odds, complementary events.

10. Calculate probabilities utilizing the addition and multiplication rules, conditional probability rules, and permutations and combinations.

11. Identify valid probability distributions and calculate the mean, variance, standard deviation, and expected value of these distributions.
12. Identify binomial probability distributions and calculate the associated probabilities.
13. Calculate the mean and standard deviation for any discrete or binomial probably distribution.
14. Identify continuous probability and the standard normal probability and calculate the associated probabilities.
15. Calculate the mean and standard deviation for any continuous probably distribution.
16. Apply the Central Limit Theorem to continuous probability distributions when appropriate.
17. Utilize the Normal Approximation to the Binomial Distribution when appropriate.
18. Create a confidence interval to estimate a population proportion or mean (standard deviation of population known or unknown).
19. For hypothesis testing, identify null and alternative hypotheses, Type I and II errors, and properly state conclusions.
20. Calculate test statistics and identify critical regions, significance levels, critical values, and P-values for hypothesis testing.
21. Utilize hypothesis testing to test claims about population proportions and means (standard deviation of population known or unknown).
22. Demonstrate a basic understanding of statistical methods and apply these techniques in analyzing
      statistical reports using available technology.
23. Demonstrate quantitative decision making ability based on statistical information.
24. Perform statistical analysis of real world data to draw conclusions through hypothesis testing.