Sinclair Community College
444 E. Third St.
Dayton, OH 45402

Master Syllabus

MAT 1450 - Introductory Statistics

Division: Science, Mathematics and Engineering

Department: Mathematics

Credit Hour Total: 4.0 **Lecture Hrs:** 3.0 **Lab Hrs:** 2.0

Prerequisite(s): MAT 0200

Other Prerequisite(s): AND Other with a grade of C or better or satisfactory score on math placement test

Date Revised: August 2017

Course Description:

An introduction to the fundamental ideas of statistics, including statistical methods to gather, analyze and present data; fundamentals of probability; statistical distributions, sampling distributions, confidence intervals, hypothesis testing, Chi-square tests, regression and correlation. Three classroom, two lab hours per week. Note: Students who have not completed the required pre-requisite courses listed, but have successfully completed MAT 0100 with a grade of "C" or better, can register for MAT 1450 together with the co-requisite course MAT 0450, Introductory Statistics Booster.

General Education Outcomes:

- Critical Thinking/Problem Solving Competency
- Computer Literacy Competency
- Information Literacy Competency

Course Outcomes:

Inferential Statistics
Infer values of population parameters from confidence intervals; infer whether or not a hypothesis should be rejected; infer appropriate relationships between variables from scatter diagrams and correlation coefficients.

Assessment Method: Locally developed exams
Performance Criteria: Score of 70% or better on exams

Assessment Method: Performance appraisals
Performance Criteria: Score of 70% or better on lab reports

Distributions and Statistical Graphs
Construct frequency distributions and statistical graphs.

Assessment Method: Locally developed exams
Performance Criteria: Score of 70% or better on exams

Assessment Method: Performance appraisals
Performance Criteria: Score of 70% or better on lab reports

Descriptive Statistics
Compute descriptive statistics such as the mean, median, percentiles, z-scores, and standard deviation; and follow directions in laboratory activities.

Assessment Method: Locally developed exams
Performance Criteria: Score of 70% or better on exams

Assessment Method: Performance appraisals
Performance Criteria: Score of 70% or better on lab reports

Probability
Evaluate basic probabilities using formulas and definitions; and evaluate Binomial and Normal probabilities from formulas and tables.

Assessment Method: Locally developed exams
Performance Criteria: Score of 70% or better on exams

Outline:

Select and produce appropriate graphical, tabular, and numerical summaries of the distributions of variables in a data set. Summarize such information into verbal descriptions.Summarize relationships in bivariate data using graphical, tabular, and numerical methods including scatter plots, two-way tables, correlation coefficients, and least squares regression lines. Investigate and describe the relationships or associations between two variables using caution in interpreting correlation and association.Use the normal distribution to interpret z-scores and compute probabilities.Understand the principles of observational and experimental studies including sampling and experimental studies including methods, randomization, replication and control. Understand how the type of data collection can affect the types of conclusions that can be drawn.Construct a model for a random phenomenon using outcomes, events, and the assignment of probabilities. Use the addition rule for disjoint events and the multiplication rule for independent events. Compute conditional probabilities in the context of two-way tables.Introduce the concept of a sampling distribution. Discuss the distribution of the sample mean and sample proportion under repeated sampling (Central Limit Theorem). Students should be expected to simulate or generate sampling distributions to observe, empirically, the Central Limit Theorem.Estimate a population mean or proportion using a point estimate and confidence intervals , and interpret the confidence level and margin of error. Understand the dependence of margin of error on sample size and confidence level.Given a research question involving a single population, formulate null and alternative hypotheses. Describe the logic and framework of the inference

of hypothesis testing. Make a decision using a p-value and draw an appropriate conclusion. Interpret statistical significance.Carry out a hypothesis test for a mean or proportion. Interpret statistical and practical significance in this setting.Perform interval estimation and hypotheses testing for two-sample problems (e.g., difference of two means or proportions and chi-square test of independence).