Department Master Syllabus

# Camden County College

**Blackwood, New Jersey**

**Course Title**:Statistics for Technology

**Course Number**:MTH-132

**Department/Program Affiliation:** Mathematics

**Date of Review: 11/2018**

(This Department Master Syllabus has been examined by the program/department faculty members and it is decided that no revision is necessary at this time.)

**Date of Last Revision**: **11/2018**

(This Department Master Syllabus has been examined by the program/department faculty members and it is decided a change requiring a revision is necessary at this time.)

**N.B.** A change to the course materials alone (textbooks and/or supplementary materials) may not constitute a revision. Any other change to the items listed below on this form is considered a revision and requires approval by the program faculty at a Program/Department Meeting and by the division at a Chairs and Coordinator Meeting.

**Credits:** 4

**Contact Hours**: **Lecture** 4 **Lab** 0 **Other**

**Prerequisites:** Algebraic Concepts (MTH-100) **AND** Reading Skills III (ENG-013)) **OR** proper placement exam scores.

**Corequisites**: None

**Course Description:**

This course is designed for technology students who need a basic knowledge of statistical and elementary research techniques. Topics covered include: frequency distributions, sigma notation, measures of central tendency, measures of variability, fundamentals of probability, binomial distribution, normal distribution, sampling distributions, Central Limit Theorem, confidence intervals, sample size determination, hypothesis testing on a single population, regression, and correlation, and Statistical Process Control (SPC).

**Course Student Learning Outcomes:** (Cognitive, Psychomotor, Affective Domains)

After completing the course students will be able to

* summarize and organize numerical data through the use of tables and charts, and compute statistics for the data set, as assessed by tests, quizzes, homework, or projects.
* solve probability and probability distribution problems, including the binomial and normal distributions, as assessed by tests, quizzes, homework, or projects.
* compute confidence intervals for a population mean, population standard deviation, and population proportion, as assessed by tests, quizzes, homework, or projects.
* perform a one-parameter hypothesis test for a population mean, population standard deviation, and population proportion, as assessed by tests, quizzes, homework, or projects.
* perform a linear regression test to a set of paired-data, as assessed by tests, quizzes, homework, or projects.
* perform a statistical process control test (SPC) to a data set to analyze variation of a mean, range, and proportion, as assessed by tests, quizzes, homework, or projects.

**General Education Student Learning Outcomes:**

Students will apply appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

## Course Outline:

### **Unit I** Introduction-The Nature of Probability and Statistics

1. 1.1 Introduction

1. 1.2 Descriptive and Inferential Statistics
2. 1.3 Variables and Types of Data
3. 1.4 Data Collection and Sampling Techniques
4. 1.5 Observational and Experimental Studies
5. 1.6 Uses and Misuses of Statistics

### **Unit II** Frequency Distributions and Graphs

1. 2.1 Introduction
2. 2.2 Organizing Data
3. 2.3 Histograms and Relative Frequency Histograms

**Unit III** Data Description

1. 3.1 Introduction

1. 3.2 Measures of Central Tendency
2. 3.3 Measures of Variation
3. 3.4 Measures of Position
4. 3.5 Exploratory Data Analysis

**Unit IV** Probability

1. 4.1 Introduction

2. 4.2 Sample Spaces and Probability

### **Unit V** Discrete and Continuous Probability Distributions

1. 5.1 Introduction
2. 5.2 Probability Distributions
3. 5.3 Mean, Variance and Expectation
4. 5.4 Binomial Distribution

**Unit VI** The Normal Distribution

1. 6.1 Introduction
2. 6.2 Properties of the Normal Distribution
3. 6.3 The Standard Normal Distribution
4. 6.4 Applications of the Normal Distribution
5. 6.5 The Central Limit Theorem
6. 6.6 The Normal Approximation to the Binomial Distribution

### **Unit VII** Intervals and Sample Size

1. 7.1 Introduction

2. 7.2 & 7.3 Confidence intervals and Sample Size for a population mean: Large and Small

3. 7.4 Confidence Intervals and Sample Size for a Proportion

4. 7.5 Confidence intervals for variances and standard deviations

### **Unit VIII** Hypothesis Testing: one sample

1. 8.1 Introduction
2. 8.2 Steps in Hypothesis Testing

3. 8.3 & 8.4 Testing a claim about a mean: large and small samples

4 8.5 Testing a claim about a proportion

5 8.6 Testing a claim about a standard deviation or variance

**Unit IX** Correlation and Regression

1. 10.1 & 10.2 Overview

2. 10.3 Correlation

3. 10.4 Regression

4. 10.5 Coefficient of Determination and Standard Error of the Estimate

5. 10.6 Multiple Regression (optional)

#### **Unit X** Statistical Process Control

1. Control Charts for Variation and Mean
2. Control Charts for Attributes

**Course Activities:**

1. Classroom lecture using the TI 83 and Minitab or EXCEL

2. Classroom discussion using the TI 83 and Minitab or EXCEL

3. Homework assignments using the TI 83 and Minitab or EXCEL

4. Tests or statistics projects as determined by the instructor using the TI 83 or Minitab or EXCEL

**Assessment of Student Learning Outcomes**: The student will be evaluated on the degree to which student learning outcomes are achieved. A variety of methods may be used such as tests, class participation, projects, homework assignments, etc. (there must be some evidence that the learning outcomes have been achieved.)

1. In-class tests

2. Quizzes when appropriate

3. Graded homework assignments when appropriate

4. Class attendance is up to instructor.

5. Comprehensive final examination (Optional)

## **Grading:**

Grades will be based on the student’s performance in the above designated areas. Percentages will be assigned by each individual professor.

A 90 to 100

B 80 to 89

C 70 to 79

D 60 to 69

F Below 60

I Incomplete (only under extreme emergencies)

Must be completed within one semester.

NA Not Attending

XA Never Attended

W Withdraw (student must complete official withdrawal form by the deadline)

**Course Materials:**

**Textbook:** *Statistics for Business and Economics*, McClave, Benson, & Sincich, Pearson, current ed.

**Supplemental Materials:** Student Solution Manual.

Textbook specific course management system.