Virginia Western Community College
MCR 5
Learning Support for Quantitative Reasoning

Prerequisites
Completion of any three (3) of the MTE modules MTE 1; MTE 2; MTE 3; MTE 4; or MTE 5

Corequisites
MTH 155: Statistical Reasoning

Course Description
Provides instruction for students who require minimum preparation for college- level Statistical Reasoning. Students in this course will be co-enrolled in MTH 155. Credits are not applicable toward graduation and do not replace MTE courses waived. Successful completion of Statistical Reasoning results in the prerequisite MTE modules being satisfied. Lecture 2 hours. Total 2 hours per week.

Semester Credits: 2   Lecture Hours: 2

Required Materials

Textbook:
Introduction to Statistics: An active learning approach. Carlson & Winquist. 2nd edition. Sage. ISBN: 9781483378732.

Other Required Materials:
Scientific Calculator

Textbook:
Introductory Statistics through Open Stax, which can be found for free at the following link:
https://cnx.org/contents/MBiUQmmY@18.54:kcV4GRqc@9/Preface

Course Outcomes

At the completion of this course, the student should be able to:
- Identify the difference between discrete and continuous quantitative data
- Construct and interpret graphical displays of data, including (but not limited to) box plots, line charts, histograms, and bar charts
- Construct and interpret frequency tables
- Compute measures of center (mean, median, mode), measures of variation, (range, interquartile range, standard deviation), and measures of position (percentiles, quartiles, standard scores)

- Recognize a representative sample and describe its importance
- Identify methods of sampling
- Explain the differences between observational studies and experiments
- Recognize and explain the key concepts in experiments, including the selection of treatment and control groups, the placebo effect, and blinding
- Describe the difference between relative frequency and theoretical probabilities and use each method to calculate probabilities of events
- Calculate probabilities of composite events using the complement rule, the addition rule, and the multiplication rule
- Use the normal distribution to calculate probabilities
- Identify when the use of the normal distribution is appropriate
- Recognize or restate the Central Limit Theorem and use it as appropriate
- Explain the difference between point and interval estimates
- Construct and interpret confidence intervals for population means and proportions
- Interpret the confidence level associated with an interval estimate
- Conduct hypothesis tests for population means and proportions
- Interpret the meaning of both rejecting and failing to reject the null hypothesis
- Describe Type I and Type II errors in the context of specific hypothesis tests
- Use a p-value to reach a conclusion in a hypothesis test
- Analyze scatterplots for patterns, linearity, and influential points
- Determine the equation of a least-squares regression line using statistical software and interpret its slope and intercept
- Calculate the correlation coefficient and the coefficient of determination using statistical software and interpret both.
- Conduct a chi-squared test for independence between rows and columns of a two-way contingency table

Topical Description

Course Sequencing

1. Open Stax Introductory Statistics Chapter 1

2. Carlson & Winquist Chapter 1

3. Carlson & Winquist Chapter 2

4. Carlson & Winquist Chapter 3

5. Carlson & Winquist Chapter 4

6. Open Stax Introductory Statistics Chapter 3

7. Open Stax Introductory Statistics Chapter 4: Sections 4.1-4.3

8. Carlson & Winquist Chapter 5

9. Carlson & Winquist Chapter 6

10. Carlson & Winquist Chapter 7

11. Carlson & Winquist Chapter 8

12. Open Stax Introductory Statistics Chapter 8: Section 8.3

13. Open Stax Introductory Statistics Chapter 9: Section 9.6

14. Open Stax Introductory Statistics Chapter 11: Section 11.1

15. Carlson & Winquist Chapter 14

16. Open Stax Introductory Statistics Chapter 12

Notes to Instructors

- MCR 5 is designed to provide support to students so they can be successful in MTH 155. Instructors must be open and flexible in their planning to meet students where they are in their understanding of the content. Instructors of MCR 5 must communicate with the instructor(s) of MTH 155 to know the pacing and expectations for their students.
- No additional, outside of class, assignments should be given
- Students are graded as S/U
  - S (successful): students attended and participated in class, passed MTH 155 with a C or better
  - U (unsuccessful): students did not attend/participate in class, received F or D in MTH 155