MTH 155, Statistical Reasoning
Elite Learning—Fall 2020

Supporting Colleges: MECC SWCC VHCC

Southwest Virginia Education and Training Network

Contact Information

Instructor: Sherri Gardner

E-mail: The best way to reach us is by sending a message within your Canvas course; however, my email address is Sherri.Gardner@scottschools.com. Email should only be used as a last resort. Students should expect to receive message responses within 48 hours. Messages will post under your course announcements, so be sure to read the announcements!

Asynchronous Online Course via Canvas: https://learn.vccs.edu/courses/311840

Course Description

VCCS Master Course Description: This course presents elementary methods and concepts including visual data presentation, descriptive statistics, probability, estimation, hypothesis testing, correlation and linear regression. Emphasis is placed on the development of statistical thinking, simulation, and the use of statistical software.

Students who successfully complete this course will earn 1 high school credit and 3 hours of college credits for Statistical Reasoning (MTH 155).

Prerequisites

Students must have successfully completed Algebra I, Algebra II, and Geometry before taking this course. They must also receive a passing Math Placement Test Score at your community college.

Course Materials

All online resources are used for this course. No textbook is required. All course materials were selected to meet the course goals and objectives. Students should contact their facilitator or guidance counselor if there are problems accessing the sites at your school. If you are unable to receive materials within the first few days of class, contact the instructor.

Time & Location of Class Meeting

This course is asynchronous, which means you will be able to access your course material at any time of the day or night. You should have a specific time in the day that you will be assigned to work on your assignments for this course. It is critical to log into your course on a daily basis. Any time the instructor notes you have not logged for 3 or more school days, your school will be notified.

In the event of remote or distance learning, your instructor will be available in a variety of ways. Your instructor should provide at least one email, possibly several. Instructors could provide any of the following, contact numbers, virtual office hours via Google Meet or Zoom, any approved and open resource communication apps, etc. You should feel able to contact your instructor via any method they provide, notably office hours are provided for the express purpose of contact. Your instructor will only provide that option if they are committed to being available during that time and via that method.

Technology Requirement:

Students will be required to complete and submit assignments by using Canvas, the learning management system for Elite Learning. Students will need use of the Internet for all coursework.

The Virginia Community College System offers Microsoft Word for free to currently enrolled students. Students are eligible to install Office 365 on up to 5 devices at no cost. The Office 365 product includes Microsoft Word, Excel, PowerPoint, and Outlook. Students can download Microsoft Office 365 by going to: http://office.vccs.edu. Students will use their full My VCCS email address as their username, and their My VCCS password to log into the site.

Technical Support:

Technical problems are not common but occur from time-to-time. Trouble tickets, for the most part, will be sent directly to the technical support team at the community college. Students should refer to the *How to Receive Technical Support* document to receive prompt support. This document is found in the *Elite Learning Guide for Students* on Page 28. You should receive a response within 24 hours (usually much sooner). After you have submitted the trouble ticket, please send me an email or message to let me know what problems you are having.

Attendance Policy:

Because this is an Internet based course, there is not a scheduled time set for your coursework. Regular class attendance is required. When absence from a class is necessary, it is the responsibility of the student to inform the instructor prior to the absence. The student is responsible for the subsequent completion of all work missed during an absence. The Virginia Community College System is committed to academic quality and student success. Elements that support both values are regular attendance and participation in class. The college policy states that regular class attendance is required.
At least once every school day, you are required to log into Canvas and perform three tasks:

1. Check your inbox for new messages.
2. Check for new course announcements.
3. Check the calendar under to see what work is due.

You should then proceed to work on the assignments within the current unit.

Elite Learning Inclement Weather or School Closure Policy:

Asynchronous online courses have many advantages over the traditional classroom. Among those advantages are the availability of the instructor, the opportunity to "attend" class from many locations, the flexibility of schedule, and no make-up days due to snow. To provide the required amount of “seat-time” for students, Elite Learning instructors will continue to present class material and require assignment submissions. When some schools are temporarily closed, it is necessary to require a continuation of assigned work even if students are absent from school due to weather or school closures. It is the responsibility of the student to access the class via Internet during this type of absence. **Students without Internet access beyond school hours will need to discuss this with their instructor at the beginning of the semester.**

This policy will also be in place due to Covid-19 school closures or any other unexpected closures.

Teaching Methods:

Homework assignments will be given as suggested to help the student prepare for each of the tests. The suggested homework problems will be taken up for a grade and it is expected of the student to complete each set of homework problems assigned. Assignments will be randomly selected for either full grading, selected

problems graded, or completion credit. You will not be told ahead of time how each assignment will be graded, so it is in your best interest to complete all the assignments as if they are going to be completely graded.

How to be Successful

- Make sure you read through this entire document. There is useful information here.
- Stay on task by printing off your assignment sheets and keeping them in a notebook with a calendar. Assignments will also be entered on the calendar in Canvas, so you can keep track of all your classes in one place. This video should be present in at least one of your Canvas classes to show you how to navigate Canvas, but if not, this link may help you. https://instructure.instructuremedia.com/embed/622f1ff9-566b-4f69-94b9-9f5b5b9824c8-184
- Plan ahead, and do not procrastinate. The dual enrollment classes are college classes. An asynchronous class requires discipline. If you are not self-disciplined in your studies, then you need to rethink your decision to take this class.
- You must stay focused and keep a steady pace, or you will fall behind.
- Technical difficulties may occur. Remember that technical difficulties happen with online courses. Report technical problems as soon as possible by submitting a trouble ticket at www.svetn.org under the Contact tab.

Method of Evaluating Student Achievement

Grading Policy & Scale

This course will be graded on a ten-point scale:

100-90 %= A 89-80 % = B 79-70 % = C 69-60 % = D 59 % or less = F

All grades will be reported by SVETN to each school with a numeric grade and a recommended letter, but assignment of a final letter grade will be at the discretion of the student's school.

Tests will be given during the semester covering a single chapter or pair of chapters depending on the amount of material covered. The average of the scores will be the number grade for Test Average. The test average will count 35% of the final grade.

Projects and Lab will be administered throughout the semester to give the student practice applying the statistical concepts gained through each chapter. The projects will total to 25% of the student's final grade.

A med-term and final exam will be given at the end of the course; both exams will be comprehensive to date of administration. The Mid-Term and Final Exam combined to count as 25% of the final average.

- Test Average 35%
- Project and Lab Average 25%
- Homework 15%
- Mid Term and Final Exam 25%

Late Work Policy:

It is your responsibility to log into the course each school day. Students are expected to work on course assignments for a minimum of 60 minutes per school day. If you are absent or unable to log on, please send a message explaining your absence as soon as possible. If you do not log on for more than three school days in a row, your guidance counselor will be contacted.

This is a college course, and you are expected to plan ahead for due dates and give yourself plenty of time to complete all work. DO NOT wait until the last minute. For example, if a writing assignment is open for an entire week, but you wait until ten minutes before the assignment closes and experience a technical problem, you will not be given an extension because ample time was provided for you to submit your work. Plan accordingly if you will be out of school on trips. All work must be completed before leaving for a school trip to prevent them from being late. Due dates are located on the calendar and throughout the course.

If you do not turn in an assignment on the deadline, you will be allowed to submit it with point deductions for one week (exceptions may apply). For example: If assignment is due on August 10, you will have until August 17 to submit it for partial credit. There will be an automatic 25 point deduction for all late submissions.

- Sue doesn't turn in her work by the August 10 deadline. On August 11, the instructor posted the following into Sue grade book: *This assignment was due on August 10 but not submitted. You may submit the work until August 17 with a 25-point deduction.*
- Sue turns in her work three days late. After grading the assignment, her instructor believes it is quality work. He assigns her a 90 BUT he then deducts 25 points because the assignment was late. Sue will see a 65 in the grade book. Students will be made aware of the last day to submit the assignment within the grade book.
- If Sue doesn't turn in her assignment by the final deadline, she will see the following statement in her grade book. *This assignment is now closed. It was not submitted by the final deadline. You may longer submit this assignment for a grade. Previous message: This assignment was due on August 12 but not submitted. You will have until March 19 to submit it for partial credit.*

Exceptions to the late work policy will only be allowed IF a documented excuse is provided by your school's guidance counselor or administrative staff (illness, family emergency, etc.). Email the teacher if problems occur so they can be handled on a one-on-one basis. Please be aware that SVETN's schedule requires that we adhere to deadlines, even when schools are closed. If you have internet access at home, continue to log in and participate in class even if your school is closed. If you do not have home internet access, it is your responsibility to inform the instructor at the beginning of the semester.

Disabilities

Students who participate in this class are also high school students. Each high school has resources available for students with disabilities (IEP). Please contact the guidance counselor at your school to request academic accommodations. Each community college also has the Office of Student Services, which may be able to provide additional services. A representative from your school (guidance counselor) may make a request for services at the college. That office will evaluate the request and make recommendations for appropriate and reasonable accommodations, which the student will provide to the instructor. Please contact your guidance counselor or SVETN for more information.

Emergency Policy

Follow all emergency policies for your home school.

Academic Integrity

Each student will be bound by the academic codes of their school. Any violations will be reported to the student's school for appropriate disciplinary action. Cheating will not be tolerated. Because these courses are considered college courses, each student is considered a responsible adult. It is assumed that students will maintain standards of conduct appropriate to membership in Elite Learning as well as the community college. Emphasis is placed on standards of student conduct rather than on limits or restrictions. Guidelines

and regulations governing student conduct are developed by the Elite Learning faculty, staff, and administration. More detailed information is found in the *Elite Learning Student* Guide.

Course Learning Outcomes/Objectives:

Communication

- Interpret and communicate quantitative information and mathematical and statistical concepts using language appropriate to the context and intended audience.
- Use appropriate statistical language in oral, written, and graphical terms.
- Read and interpret graphs and descriptive statistics.

Problem Solving

- Make sense of problems, develop strategies to find solutions, and persevere in solving them.
- Understand what statistical question is being addressed, use appropriate strategies to answer the question of interest, and state conclusions using appropriate statistical language.

Reasoning

- Reason, model, and draw conclusions or make decisions with quantitative information.
- Use probability, graphical, and numerical summaries of data, confidence intervals, and hypothesis testing methods to make decisions.
- Support conclusions by providing appropriate statistical justifications.

Evaluation

- Critique and evaluate quantitative arguments that utilize mathematical, statistical, and quantitative information.
- Identify errors such as inappropriate sampling methods, sources of bias, and potentially confounding variables, in both observational and experimental studies.
- Identify mathematical or statistical errors, inconsistencies, or missing information in arguments.

Technology

- Use appropriate technology in a given context.
- Use some form of spreadsheet application to organize information and make repeated calculations using simple formulas and statistical functions.
- Use technology to calculate descriptive statistics and test hypotheses.

Graphical and Numerical Data Analysis

- Identify the difference between quantitative and qualitative data
- 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)

Sampling and Experimental Design

- 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

Probability Concepts

- 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.

Statistical Inference

- 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.
- Use a p-value to reach a conclusion in a hypothesis test.
- Identify the difference between practical significance and statistical significance.

Correlation and Regression

- Analyze scatterplots for patterns, linearity, and influential points
- Determine the equation of a least-squares regression line and interpret its slope and intercept.
- Calculate and interpret the correlation coefficient and the coefficient of determination.
- Categorical Data Analysis
- Conduct a chi-squared test for independence between rows and columns of a two-way contingency table.

Course Major Statistical Units	**Specific Student Learning Outcomes for Units** **The student will be able to…**
Unit: Graphical and Numerical Data Analysis Topics: Data Types, Displays of Data, Measures of Center, Variation, and Position	● Identify the difference between quantitative and qualitative data (0.25) ● Identify the difference between discrete and continuous quantitative data (0.25) ● Construct and interpret graphical displays of data, including (but not limited to) box plots, line charts, histograms, and bar charts (2.5) ● Construct and interpret frequency tables (0.5) Compute measures of center (mean, median, mode), measures of variation, (range, interquartile range, standard deviation), and measures of position (percentiles, quartiles, standard scores) (3.75)
Unit: Sampling and Experimental Design Topics: Sampling, Experimental Design	● Recognize a representative sample and describe its importance (0.25) ● Identify methods of sampling (0.5) ● Explain the differences between observational studies and experiments (0.25) Recognize and explain the key concepts in experiments, including the selection of treatment and control groups, the placebo effect, and blinding (0.5)
Unit: Probability Concepts Topics: Simple and Conditional Probabilities, Law of Large Numbers, Normal Distributions, Central Limit Theorem	● Describe the difference between relative frequency and theoretical probabilities and use each method to calculate probabilities of events (0.75) ● Calculate probabilities of composite events using the complement rule, the addition rule, and the multiplication rule (3.0) ● Use the normal distribution to calculate probabilities (3.5) ● Identify when the use of the normal distribution is appropriate (0.25) Recognize or restate the Central Limit Theorem and use it as appropriate (1.25)
Unit: Statistical Inference Topics: Confidence Intervals, Hypothesis Testing, Significance	● Explain the difference between point and interval estimates (0.25) ● Construct and interpret confidence intervals for population means and proportions (3.25) ● Interpret the confidence level associated with an interval estimate (0.25)

	● Conduct hypothesis tests for population means and proportions (4.0) ● Interpret the meaning of both rejecting and failing to reject the null hypothesis (0.25) ● Describe Type I and Type II errors in the context of specific hypothesis tests (0.25) ● Use a p-value to reach a conclusion in a hypothesis test (0.25) Identify the difference between practical significance and statistical significance (0.25)
Unit: Correlation and Regression Topics: Scatterplots, Regression, Correlation	● Analyze scatterplots for patterns, linearity, and influential points (1.25) ● Determine the equation of a least-squares regression line and interpret its slope and intercept (2.5) Calculate and interpret the correlation coefficient and the coefficient of determination (1.25)
Unit: Categorical Data Analysis Topics: Contingency Table	Conduct a chi-squared test for independence between rows and columns of a two-way contingency table (2.5)

It is critical that all students read the Elite Learning Guide for Students. This guide is located at www.svetn.org as well as within your course. Contact Dawn Stafford, SVETN Executive Director, if you have questions or concerns.

Course syllabus and schedule is subject to change at the discretion of the instructor.