Patrick & Henry Community College

MTH 155- G1 **Statistical Reasoning** Spring 2025
Mon/Wed 7:45 to 9:15
INSTRUCTOR: Jenny J. Whittaker

OFFICE LOCATION: PHCC West Hall, room 202

OFFICE HOURS: M-F 11:00 AM – 2:30 PM, or by appointment

OFFICE PHONE: 276-656-0328, ext. 3

E-MAIL ADDRESS: jwhittaker@patrickhenry.edu
jwhittaker@pgsmst.com

CLASS MEETING TIME: M/W 7:45 AM to 9:15 AM

CLASSROOM LOCATION: PHCC West Hall, room 224

MODE OF DELIVERY: face to face

COURSE CREDITS: 3

PREREQUISITE(S): Competency in Math Essentials MTE 1-5 as demonstrated through the placement and diagnostic tests, or by satisfactorily completing the required MTE units or equivalent.

COURSE DESCRIPTION
This course presents elementary statistical methods and concepts including descriptive statistics including data presentation, descriptive statistics, probability, estimation, hypothesis testing, correlation, linear regression, and categorical data analysis. Emphasis is placed on the development of statistical thinking, simulation, and the use of statistical software.

COURSE INTRODUCTION
Because today's advances in technology make information and data readily available, effective analysis and interpretation are crucial. The field of statistics meets these needs by preparing consumers to make informed and purposeful decisions. The concepts in this course will strengthen students' understanding of how statistics—as well as the underlying research and data—impact their perspectives and their everyday lives.

A. COURSE OBJECTIVES
Upon successful completion of this course, the student should:

- Interpret and communicate quantitative information and mathematical and statistical concepts using language appropriate to the context and intended audience
- Make sense of problems, develop strategies to find solutions, and persevere in solving them.
- Reason, model, and make decisions with mathematical, statistical and quantitative information.
- Critique and evaluate quantitative arguments that utilize mathematical, statistical, and quantitative information.
- Use appropriate technology in a given context.

Content Covered

Unit 1 - Sampling and Experimental Design

- Recognize a representative sample and describe its importance.
- Identify methods of sampling.
- Explain the difference 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.

Unit 2 - 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 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).

Unit 3 - Probability Concepts

- Describe the difference between relative frequency and theoretical probabilities and use each method to calculate the probabilities of events.
- Calculate the 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 normal distribution is appropriate.
- Recognize or restate the Central Limit Theorem and use it as appropriate.

Unit 4 - Statistical Inference – Confidence Intervals and Hypothesis Testing

- 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 hypotheses 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.
- Identify the difference between practical significance and statistical significance.

Unit 5 - 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 of determination.

Unit 6 - Categorical Data Analysis – Chi Squared Test for Independence

- Conduct a chi-squared test for independence between rows and columns of a two-way contingency table.

B. VCCS CORE COMPETENCIES

Degree graduates will demonstrate the ability to

1.1 Understand and interpret complex materials;
2.6 Use problem solving skills;
4.1 Determine the nature and extent of the information needed;
4.2 Access needed information effectively and efficiently;
6.1 Use logical and mathematical reasoning within the context of various disciplines;
6.2 Interpret and use mathematical formulas;
6.3 Interpret mathematical models such as graphs, tables and schematics and draw inferences from them;

6.4 Use graphical, symbolic, and numerical methods to analyze, organize, and interpret data;
6.5 Estimate and consider answers to mathematical problems in order to determine reasonableness; and
6.6 Represent mathematical information numerically, symbolically, and visually, using graphs and charts.

C. METHOD OF INSTRUCTION

A variety of instructional methods will be utilized. As a group we will work extensively on study habits, appropriate use of the graphing calculators, and student communication – both oral and written. Students will be encouraged to actively participate in the learning process to help ensure that they understand the material. Many examples will be provided through lecture and class activities. The use of e-mail /Canvas/ThinkWave is essential.

D. TEXTBOOK(S) AND REQUIRED TOOLS OR SUPPLIES

No Textbook

Supplies

- Pencils
- One 1-2" 3-ring binder to include Notes/Homework, Quizzes/Tests, Projects/Labs
- Loose-leaf paper
- TI-84 Graphing calculator (may be checked out from the school)

E. STUDENT EVALUATION

Grades will be calculated using the points system (i.e. $\frac{points\ earned}{points\ possible}$ x 100). Each assignment will be worth a certain point value depending on the level of difficulty. Students will be assessed in various ways, including, but not limited to, homework assignments, activities, assessments, and projects.

9 weeks grading periods are calculated by the following. Each grading period grade is 40% of your final grade.

- **Homework**
  - For each lesson, students will be provided a note sheet and practice problems to complete for homework.
  - Students will discuss homework daily with a study partner. This will be followed by a class discussion led by the students.
  - Homework should be kept in a three-ring binder and should be organized chronologically by lesson number of the assignment included at the top of the page.

- **Quizzes – 50 points**
  - There will be 2-3 quizzes on the material you have learned for each unit. These quizzes are cumulative.
  - Quizzes will be completed in class and will be taken individually with the use of notes.

- **Tests – 100 points**
  - A test will be given at the end of each unit. Tests are a combination of multiple choice and free-response questions.
  - Tests will be completed in class and will be taken individually without the use of notes or other resources.
  - If your test grade is higher than your quiz average, your quiz grade will be adjusted to match your test score.

- **Projects – 50 or 100 points**
  - Students will be assigned projects throughout the semester to assess students' mastery of course content.
  - Depending on the level of difficulty, projects will be worth 50 points or 100 points as specified on the grading rubric provided with the project guidelines.
  - Projects not submitted by the due date will incur a 20% deduction per day after the due date.

- **Final Exam - 100 points**
  - Individual Project (100 points) – Student will select their own question and parameter of interest, collect data, present descriptive statistics, and support their findings with inferential statistics. Student will submit a typed report of their findings. A rubric will be provided for expectations. ***This project will not be accepted late.***

Semester Exam Policy

All students are expected to take semester exams on the day scheduled. Only in a rare case, such as illness confirmed by a physician, death in the family, or a required base school activity confirmed by a student's principal will a make-up be allowed. **All exceptions to the examination schedule must be approved ahead of time by the Director.** If a student does not report for a semester examination due to an emergency, the Governor's School office must be notified on the day of the exam by the student's parent/guardian. Failure to follow this policy may result in a grade of zero (0) for the exam.

F. GRADING SCALE:

A	90 - 100
B	80 - 89
C	70 - 79
D	60 – 69
F	59 – below

Grades are calculated as follows
Quarter 1 – 40%
Quarter 2 – 40%
Final Exam – 20%

A student earning a grade of C or higher will earn college credit for this course.

G. EXPECTATIONS FOR STUDENT SUCCESS

- Be present for each class
  - Students should email the instructor when missing a class. All lessons will be recorded and uploaded into the Canvas Module for that date. Make sure to watch the videos and complete the accompanying assignments by the due date.
  - Students should submit a note to Mrs. East within 24 hours of the student's return with a valid reason for student's absence. ***No make-up work will be allowed*** for unexcused absences.
  - Students should see instructor the day returning from a missed class to ask questions pertaining to the lecture and/or assignment.
  - Students should make arrangements to make up quizzes/tests if missed due to absence.

- Submit all work on time.
  - Students should submit all work by the due date. Assignments not submitted by the due date will incur a 20% deduction per day after the due date.
  - Work that is to be submitted on Canvas should be uploaded in the Assignment Tab for the specified assignment. Work should be scanned and uploaded as one document. To submit assignments on Canvas, click on the link for the assignment, then upload the file, preview the file to ensure that all portions or problems are present, then click the "submit" icon. Log out, log back in, and make sure to double check that your submission went through. "Canvas must not be working" is not an excuse for late work.

- Check grades often
  - Although all lessons are available and all work is submitted through Canvas, grades will be entered in ThinkWave. Please make sure to check these every day. If there is a problem, see me immediately. DO NOT wait until the end of the 9 weeks to discuss a problem.
  - If you are caught cheating, that grade will be recorded as a zero.

- Create a fun learning environment.
  - Students may have drinks in the classroom, provided the drink has a screw-on cap. Students must leave their area clean.
  - Students should show respect for classmates and instructor, listen carefully, and not interrupt someone who is talking.
  - **Cell phones and personal electronic devices, including smartwatches, headphones, and any device that connects to phones, are not allowed during the bell-to-bell school day. Devices must be turned off and stored in a backpack or purse, not on the student. Disciplinary action will be taken against any student found in possession of a cell phone or personal electronic device, including smartwatches, headphones, and any device that connects to phones during restricted times or in violation of school policies.**

WHAT A STUDENT CAN EXPECT FROM THE INSTRUCTOR

- On any day that a student is absent from class, the student will be able to access the recorded lesson and proceed as if he/she were in class.
- Homework posted on Canvas upon a student's absence from class will be assessed, and feedback provided within 48 hours.
- The instructor will evaluate and return quizzes and tests work promptly with feedback.
- The instructor will be available before school by 7:15 A.M., between classes, and after governor's school for tutoring.
- Continuous support, assistance, and encouragement.
- Timely responses to emails. Students should email the instructor using their pgsmst email accounts and emails should be sent to jwhittaker@pgsmst.com. I check my email frequently each day to answer any questions about homework, assignment clarification and will answer quickly. If outside of school hours, responses may be delayed, but I do still try to respond quickly.

H. EMERGENCY INFORMATION
In case of emergency, students should exit according to the evacuation plan posted in the classroom.

I. STUDENT SUPPORT/DISABILITY STATEMENT: *If you have a disability or other need for reasonable accommodation in order to successfully complete the requirements of this course, please contact the 504/ADA Coordinator (Learning Resource Center #109D, 276-656-0257 or 800-232-7997 ext. 0257, disabilityresources@patrickhenry.edu) to discuss this matter confidentially.*

J. IMPORTANT DATES TO REMEMBER:
The school calendar is available on the back of the student planner and at the following link: www.pgsmst.com .

K. SPECIFIC COLLEGE POLICIES
Academic Honesty
Students are expected to abide by the code of conduct and academic integrity found in the student handbook. Students will be required to sign a pledge on any take-home quizzes/tests stating *"On my honor, I have neither given nor received aid on this assignment."* Infractions of the honor code will not be tolerated and will be reported to the director and will be addressed with the student and his/her parent(s). All violations of academic integrity will also be reported to each student's honor organization.
No Generative AI Usage Permitted: For the duration of this course, the use of Generative AI in assignments is strictly prohibited. Assignments are opportunities for personal growth, critical thinking, and applying your acquired knowledge. Your individual effort and creativity are essential in demonstrating your understanding of the course material. Dependence on AI undermines these objectives and compromises the integrity of the learning process. We appreciate your commitment to academic honesty and dedication to upholding this course's principles by refraining from using Generative AI in your assignments.
Academic Integrity Policy

Inclement Weather

If Henry County schools are delayed one hour, Governor's School will open one hour late. If Henry County schools are delayed two hours, Governor's School classes will be cancelled. If Henry County schools are closed, Governor's School is closed, and classes do not meet. Henry County/Martinsville workdays do not impact classes at Piedmont Governor's School.

- Assignments and/or lectures may be posted on Canvas on days when Governor's School classes are affected by inclement weather. It is the student's responsibility to check Canvas and complete the assignments before their next class meeting.
- A link will be established on Canvas where students should submit homework that is due on a day where governor's school is cancelled. Homework should be posted by 7:00 AM of the day the assignment is due.

Internet Resources

https://www.**khanacademy**.org/
google.com

Student Procedures for using the Learning Resource Center (LRC):

The LRC Building will be open Monday – Thursday, 8am – 5pm. Students will need to sign-in when entering the building and go to the area they will use (computer lab, library, etc.). Computers and tables will be assigned at sign-in and a number given which is to be returned when the student leaves. Students will need to sign-out when leaving the building.

Need Extra Help with Content

- **Brainfuse**

Brainfuse is an online tutoring service which gives students 24/7 access to highly qualified, experienced, and specially trained tutors. Students may submit writing assignments to be evaluated/proofread. All live sessions with tutors and submitted questions are saved so students can view or print them out . Any PHCC student can access Brainfuse ***free*** of charge. Brainfuse can only be accessed through Canvas. Further information may be obtained from your instructor or the Writing Center Tutors.

- **PHCC Math Lab**

  The PHCC Math Lab is located in the LRC. Hours for this lab change each semester and are posted in the lab and on the PHCC website (academics>math resources). Experienced math tutors are always available in the math lab to assist students with their math. In addition, the math lab has computers available for student use. The PHCC tutoring coordinator can be reached at 276-656-5496 to schedule free, individual tutoring.

- Some other resources for tutoring are as follows:
  - Youtube

- Khan Academy
- Teacher Tube
- Canvas – Teacher instructional video

M. AFFIDAVIT

My signature below indicates that I have read and understand this syllabus and have been given a copy of my own to keep.

Student Name (Print)

Student Signature

Date

Parent Name (Print)

Parent Signature

Date

This syllabus conforms to the Patrick & Henry Community College syllabus guidelines.