

November, 2023

Prerequisites: Algebra proficiency (high-school algebra 2 or a college equivalent)**Faculty:** Matthew Dodd, MS
H. Elaine Frey, MA
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Beth Zamboni, PhD**Contact Information:** Faculty may be contacted through the Canvas messaging system**Additional Information:** www.portagelearning.edu^{1*}**Course meeting times:** MATH 110 is offered continuously

Course Description: A general introduction to mathematical statistics as a tool used in the decision-making process. The course is designed to help students develop an understanding of summarized data in both descriptive and inferential statistical applications through the use of frequency distributions, measures of central tendency, measures of dispersion, probability distributions, random sampling, interval estimation, hypothesis testing, comparisons involving means, and regression analysis.

Course Outcomes: As a result of this course experience a student should be able to explain:

- The difference between qualitative and quantitative data, be able to organize the data and present a meaningful overview of the data through the use of frequency distributions, measures of central tendency (i.e. the mean, median and mode) and measures of dispersion (i.e. the variance, standard deviation and coefficient of variation)
- The rules involved in developing outcome probabilities and how to apply the appropriate counting methods in the development of the probabilities of outcomes in an experiment.
- The difference between a discrete probability distribution and a continuous probability distribution.
- The concepts involving random sampling, the sampling distributions of \bar{x} and \bar{p} and other methods.
- The null & alternative hypothesis in classical hypothesis testing along with type I and II errors; one-tailed & two-tailed testing involving populations and both large & small samples.
- Linear regression analysis and lines of best fit.

^{1*} Portage Learning college courses are offered by Geneva College, which is accredited by the Middle States Commission on Higher Education. Portage Learning is included in the College's Department of Professional and Online Graduate Studies; courses are delivered through the Portagelearning.edu platform.

*Please see the *Module Topics* section below for expanded course outcomes.

Each of these MATH 110 student learning outcomes is measured:

- Directly by:
- (1) Module application problems (with instructor feedback)
 - (2) Module exams
 - (3) Cumulative final exam

Indirectly by an end of course student-completed evaluation survey

Course Delivery: This course is asynchronously delivered online. Contact hours include 40 - 50 hours of reviewed module assignments with instructor feedback. There are 15 additional contact hours composed of secure online exams.

Course Progression: It is the policy for all Portage Learning courses that only one (module/final) exam is to be completed within a 48-hour period. Research on the best practices in learning indicates that time is needed to process material for optimal learning. This means that once an exam has been completed, the next exam may not be opened or taken until 48 hours after the submission of the previous module exam. This allows for instructor feedback/class expectations as the student moves through the material. Instructors, like the College, are not available during the weekend; grading, therefore, is M-F and may take up to 72 hours during these days. Also, it is the policy of Portage Learning to support a minimum of 28 days to complete a course; this is not a negotiable time period. Please plan your time accordingly.

Note: Professors reserve the right to reset any exam taken in violation of these guidelines.

Required readings, lectures and assignments: Portage courses do not use paper textbooks. Students are required to read the online lesson modules written by the course author which contain the standard information covered in a typical course. Please note the exam questions are based upon the readings. Video lectures which support each lesson module subject should be viewed as many times as is necessary to fully understand the material.

We do not support the use of outside resources to study, except for the ones listed in the syllabus under "Suggested External References". If you have questions about the material or would like further explanation of the concepts, please contact your instructor.

Module Problem Sets: The practice problems within the modules are a part of your final grade, and the module work will be reviewed for completeness (not correctness) by the instructor. Be sure to answer all of the problems, being careful to answer the questions in your own words at all times since this is an important part of adequate preparation for the exams. For problems that require calculations, you must show your work by including the initial set up for the problem and your final answer. Problem sets submitted with only a final

answer will not be considered complete. After you answer the practice problems, compare your answers to the solutions provided at the end of the module. If your answers do not match those at the end, attempt to figure out why there is a difference. If you have any questions, please contact the instructor via the Canvas messaging system (see Inbox icon).

Academic Integrity is a serious matter. In the educational context, any dishonesty violates freedom and trust, which are essential for effective learning. Dishonesty limits a student's ability to reach his or her potential. Portage places a high value on honest independent work. We depend on the student's desire to succeed in the program he or she is entering. It is in a student's own best interests not to cheat on an exam or put their work into question, as this would compromise the student's preparation for future work. It is the student's responsibility to review the **Student Handbook** and all policies related to academic integrity. If clarification is necessary, the student should reach out to their instructor for further explanation **before** initiating module one.

Required Computer Accessories: It is recommended that students use a desktop or laptop computer, PC or Mac, when taking the course. Some tablet computers are potentially compatible with the course, but not all features are available for all tablet computers. The latest full version of Google Chrome, Firefox, Edge, or Safari browser is required for the optimal operation of the Canvas Learning Management System. In addition, this course will use the Respondus Lockdown Browser for exams; a strong internet connection is needed. You are also **required to use LockDown Browser with a webcam**, which will record you during an online, nonproctored exam. (The webcam feature is sometimes referred to as "Respondus Monitor.") **Your computer must have a functioning webcam and microphone. Additionally, students will need a photo ID that includes your picture and full name is required. Please note, Chromebooks and tablets (other than iPad) are not compatible on exams using the Lockdown Browser.** Instructions on downloading and installing this browser will be given at the start of the course. We highly recommend using a high-speed Internet connection to view the video lectures and labs. You may experience significant difficulties viewing the videos using a dial-up connection.

For more information on basic system and browser requirements, please reference the following:

Canvas browser and system

requirements: <https://community.canvaslms.com/t5/Canvas-Basics-Guide/What-are-the-browser-and-computer-requirements-for-Canvas/ta-p/66>

Respondus Requirements: <https://web.respondus.com/he/lockdownbrowser/resources/>

Respondus Monitor Requirements: <https://web.respondus.com/he/monitor/resources/>

Additional Tools: A built-in **scientific calculator** for the course has been incorporated into the website and can be found in the tool bar above each module and exam page. If you choose to purchase a calculator, keep

in mind that you do not need to purchase an expensive calculator as the features you will need are available on basic scientific calculators with a cost of less than \$20.

Modules and Assignments

- Module 1: An introduction to data and statistics. This module discusses why statistics are important, and where statistical analysis is used. Students will learn about different types of data that might be used in statistical analysis. Topics covered include: Quantitative and Qualitative Data, Experimental and Observational Studies, Data Errors, Outliers, Descriptive Statistics, Histograms, Populations, and Samples.
- Module 2: An introduction to descriptive statistics using tabular, graphical and numerical methods. This module considers ways to describe and represent data. Topics covered include: Frequency Distributions, Relative Frequencies, Charts (Column, Bar, and Pie), Cross-Tabulation, Scatter Diagrams, Measures of Central Tendency, Percentiles, Quartiles, Measures of Dispersion, Z-scores, Bell Curves, and Sample Covariance.
- Module 3: An overview of probability. This module considers experiments and the likelihood that an event will occur. Students are taught to calculate probabilities using multiple techniques. Topics covered include: Probability Distributions, Sample Space, Counting Techniques, Permutations, Combinations, Complements, Union, Intersection, Mutually Exclusive Events, Conditional Probabilities, and Bayes' Theorem.
- Module 4: An introduction to probability distributions. Students will learn about the standard normal probability distribution, and how the data is distributed with respect to the mean. Topics covered include: Random Variables (Discrete and Continuous), Expected Values, Binomial Probability Distributions, Normal Distributions, and The Standard Normal Table.
- Module 5: An overview of sampling and sampling distributions. This module explains how to calculate descriptive statistics when working with a sample instead of the entire population. Topics Covered include: Statistical Inference, Simple Random Samples, Sample Mean, Sample Proportions, The Central Limit Theorem, Sample Error, and Sample Size.
- Module 6: An introduction to interval estimation. In this module students will learn how to take a sample, find its mean, and use this information to estimate the population mean. Students will be able to construct confidence intervals for the population mean. Topics covered include: Confidence Intervals, Confidence Levels, Means, and Proportions.

- Module 7: An introduction to hypothesis testing. In this module students will be guided through the process of hypothesis testing. Students will learn to make assumptions about a certain characteristic of the population and then test to see if the hypothesis is true. Topics covered include: Null Hypothesis, Alternate Hypothesis, One-Tailed and Two-Tailed Tests, Type I and Type 2 errors, and Level of Significance.
- Module 8: An introduction to comparisons involving means and proportions. In this module students will study interval estimation and hypothesis testing for differences between two population means as well as for differences between two population proportions. Topics covered include: Dependent Samples, Independent Samples, Hypothesis Testing Involving Differences between Means, and Hypothesis Testing for Dependent Samples.
- Module 9: An introduction to regression analysis. Students will learn how to calculate the linear correlation coefficient for a set of data to reveal how well two variables are correlated. Students will also learn how to find the best fit line that approximates the relationship between these variables. Topics covered include: Linear Correlation Coefficients, Positive Correlations, Negative Correlations, Critical Values Correlation Coefficient, and Linear Regression
- Module 10: An overview of various tests that were not covered in previous modules. Students will learn about goodness of fit tests, tests for independence, and analysis of variance. Topics covered include: Chi-Square Distributions, F Distributions, Multinomial Experiments, Expected Counts, Goodness of Fit Tests, and Tests for Independence.

Suggested Timed Course Schedule (to complete the course within a typical college semester)

All Portage courses are offered asynchronously with no required schedule to better fit the normal routine of adult students, but the schedule below is suggested to allow a student to complete the course within a typical college semester. Students may feel free to complete the course on a schedule determined by them within the parameters outlined under “Course Progression.”

<u>Time Period</u>	<u>Assignments</u>	<u>Subject Matter</u>
Days 1-10	Module 1, Exam 1	Data and Statistics
Days 11-20	Module 2, Exam 2	Des. Statistics: Tabular / Graphical & Numerical Methods
Days 21-30	Module 3, Exam 3	Introduction to Probability
Days 31-40	Module 4, Exam 4	Probability Distributions... Discrete and Continuous

Days 41-50	Module 5, Exam 5	Sampling and Sampling Distributions
Days 51-60	Module 6, Exam 6	Interval Estimation
Days 61-70	Module 7, Exam 7	Hypothesis Testing
Days 71-80	Module 8, Exam 8	Comparisons Involving Means
Days 81-90	Module 9, Exam 9	Regression Analysis
Days 91-100	Module 10, Exam 10	Various Tests
Days 101-108	Final Exam	Comprehensive - including all course material

Grading Rubric:

Check for Understanding =	1 pt.
10 Module Problem Sets = 5 pts. each x 10 =	50 pts.
Module 1 Exam = 50 pts.	50 pts.
Module 2 Exam = 50 pts.	50 pts.
Module 3 Exam = 50 pts.	50 pts.
Module 4 Exam = 50 pts.	50 pts.
Module 5 Exam = 50 pts.	50 pts.
Module 6 Exam = 50 pts.	50 pts.
Module 7 Exam = 50 pts.	50 pts.
Module 8 Exam = 50 pts.	50 pts.
Module 9 Exam = 50 pts.	50 pts.
Module 10 Exam = 50 pts.	50 pts.
<u>Final exam = 100 pts.</u>	<u>100 pts.</u>
Total	651 pts.

The current course grade and progress is continuously displayed on the student desktop.

Grading Scale:

96.5% - 100%	= A+
92.5% - 96.4%	= A
89.5% - 92.4%	= A-
86.5% - 89.4%	= B+
82.5% - 86.4%	= B
79.5% - 82.4%	= B-
76.5% - 79.4%	= C+
72.5% - 76.4%	= C
69.5% - 72.4%	= C-
66.5% - 69.4%	= D+
62.5% - 66.4%	= D
59.5% - 62.4%	= D-
0% - 59.4%	= F

Suggested External References:

If the student desires to consult a reference for additional information, the following textbooks are recommended as providing complete treatment of the course subject matter.

- John S. Witte, Robert S. Witte, **Statistics**, Wylie 9th Ed.

NOTE: We do not support the use of outside resources to study, except the one listed above.

Learning Support Services:

Each student should be sure to take advantage of and use the following learning support services provided to increase student academic performance:

Video lectures: Supports diverse learning styles in conjunction with the text material of each module

Messaging system: Provides individual instructor/student interaction

Tech support: Available by submitting a help ticket through the student dashboard

Accommodations for Students with Learning Disabilities:

Students with documented learning disabilities may receive accommodations in the form of an extended time limit on exams, when applicable. To receive the accommodations, the student should furnish documentation of the learning disability at the time of registration, if possible. Scan and e-mail the documentation to studentservices@portagelearning.edu. Upon receipt of the learning disability documentation, Portage staff will provide the student with instructions for a variation of the course containing exams with extended time limits. This accommodation does not alter the content of any assignments/exams, change what the exam is intended to measure or otherwise impact the outcomes of objectives of the course.

One-on-one Instruction

Each student is assigned to his/her own instructor. Personalized questions are addressed via the student dashboard messaging system.

Online learning presents an opportunity for flexibility; however, a discipline to maintain connection to the course is required; therefore, communication is essential to successful learning. **Check your messages daily.** Instructors are checking messages daily Monday-Friday to be sure to answer any questions that may arise from you. It is important that you do the same, so you do not miss any pertinent information from us.

Holidays:

During the following holidays, all administrative and instructional functions are suspended, including the grading of exams and issuance of transcripts.

New Year's Day

Easter

Juneteenth

Labor Day

Christmas Break

MLK Day

Memorial Day

Independence Day

Thanksgiving weekend

The schedule of holidays for the current calendar year may be found under the Student Services menu at www.portagelearning.edu

Code of Conduct: Students are expected to conduct themselves in a way that supports learning and teaching and promotes an atmosphere of civility and respect in their interactions with others. Verbal and written aggression, abuse, or misconduct is prohibited and may be grounds for immediate dismissal from the program.

This is a classroom; therefore, instructors have the academic freedom to set forth policy for their respective class. Instructors send a welcome e-mail detailing the policy of their class, which students are required to read prior to beginning the course.

Grievances: If a student has a complaint about the coursework or the instructor, the student is advised to first consult the instructor, who will be willing to listen and consider your concern. To file a formal grievance for consideration by the Academic Review Committee, the process must be initiated via written communication to academics@portagelearning.edu.

Remediation: At Portage Learning we allow a "one-time" only opportunity to re-take an alternate version of **one** module exam on which a student has earned a grade lower than 70%. This option must be exercised before the final exam is started. If an exam is retaken, the original exam grade will be erased, and the new

exam grade will become a permanent part of the course grade. However, before scheduling and attempting this retest, the student must resolve the questions they have regarding the material by reviewing both the old exam and the lesson module material. Once ready to attempt the retest of the exam they must contact their instructor to request that the exam be reset for the retest. Remember, any module retest must be requested and completed **before** the final exam is opened.

Note: Exams on which a student has been penalized for a violation of the academic integrity policy may not be re-taken.

Syllabi are subject to change as part of ongoing educational review practices. Students are responsible for accessing and using the most recent version of the course syllabus.