CNSL 503 Statistics (graduate-level)   3 credits

Prerequisites: MATH 110 Introduction to Statistics or equivalent
Instructors: Brittany Martinez, Ph.D.

Contact Information: Faculty may be contacted through the Canvas messaging system.
Additional Information: www.portagelearning.com[*]
Course meeting times: CNSL 503 is offered continuously.

Course Description: This graduate course provides an introduction to descriptive and inferential statistics. The course is designed to help students gain an understanding of several different types of statistical approaches and skills in being able to discern the most appropriate statistical test to run on a given dataset. Students will also have the opportunity to directly apply the knowledge of these statistical procedures through statistical software in the applied projects component of the course. Topics include descriptive and inferential statistics, hypothesis testing, z-scores, t tests, ANOVA, correlational analysis, linear regression, and chi-square analysis.

Course Outcomes: As a result of this course experience, a student should be able to:
- Describe both descriptive and inferential statistics
- Identify and create different types of graphs
- Describe and create frequency distributions
- Identify the measures of central tendency and describe how they are calculated
- Identify measures of variability and describe how they are calculated
- Describe different sampling techniques
- Describe the standard normal curve
- Describe hypothesis testing and its logic
- Describe confidence intervals, effect size related to sample size planning, and statistical power
- Identify the proper statistical test to perform on a given dataset
- Perform all steps in a z-test
- Perform all steps in a one sample t-test
- Perform all steps in a paired samples t-test
- Perform all steps in an independent samples t-test
- Perform all steps in a one-way ANOVA
- Perform all steps in a two-way ANOVA
- Perform all steps in Pearson's r correlation

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[*] Portage Learning college courses are offered by Geneva College, an accredited institution 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.com platform.

- Perform all steps in linear regression
- Perform a chi-square analysis

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

The CNSL 503 student learning outcomes are measured:

<u>Directly</u> by: (1) Module application problems (with instructor feedback)

                            (2) Module exams

                            (3) Applied projects

                            (4) Cumulative final exam

<u>Indirectly</u> by an end of course student-completed evaluation survey

Course Delivery: This course is asynchronously delivered online. Contact hours include 50 - 60 hours of reviewed module assignments with instructor feedback and video lectures. There are 10 additional contact hours composed of secure online exams.

Course Progression: It is the policy for all Portage Learning courses that only one (module lecture/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 21 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 that 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 Review Questions: The practice problems within the modules are not quantitatively part of your final grade, but the module work is a pass/fail component of the course and will be reviewed for completeness by the instructor. **Be sure to answer all 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.** After you answer the practice problems, compare your answers to the solutions 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).

NOTE: Module review questions are not an option or a choice; *they are required*. This means that you must complete all the review questions within the modules. Not only are review questions class participation, they are the best way to prepare for the exams.

Testing Area Validation

Validity of the student's work is of primary concern regarding online education. As part of our effort to maintain the highest levels of academic integrity while also respecting student sensibilities, Geneva - Portage Learning has contracted with Respondus to provide extensive exam coverage utilizing both Lockdown Browser and AI monitoring capabilities in all applicable courses. The first step before every exam includes validation of the testing area. Please review the testing area *requirements* outlined within the course. Failure to validate the testing area will result in a warning on the first offense and a zero on the exam for any subsequent offenses.

OFFENSE	DEFINITION	ACTION
TAIW: *Test Area Invalidation Warning*	**Test Area Invalidation Warning** occurs when a student- for the *first time*- fails to: ✓ do a sufficient room scan *and/or* ✓ show their ID (in a readable manner)	No point deduction
TAI: *Test Area Invalidation*	**Test Area Invalidation** occurs when a student- for the *second time*- fails to: ✓ do a sufficient room scan *and/or* ✓ show their ID (in a readable manner) ✓ and they do not head any advice given in their initial warning. PLEASE NOTE: Should this occur additional times, the student will continue receiving "Testing Area Invalidations" with zeros on their exams.	0 on the exam

Academic Honesty 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. In a distance learning situation, 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, as this would compromise the student's preparation for future work.

It is required of each student to take exams without consulting course materials or study aids including another person, the lesson pages, printed materials, or the Internet. It will be necessary to show all your work on exams.

- **Answers are to be written in your own words and not simply memorized from course material. Word for word answers from course material will be considered plagiarism.**
- **Students may not reference or use outside materials from <u>any</u> source, including their own notes or drafts in a word processing document, unless explicitly instructed to do so.**
- **Additionally, as we are required to evaluate the mastery of the material presented in <u>this</u> course, the use of content/processes/methods from a previous course will be considered as the use of an outside resource.**

A violation of the academic honesty policy will result in a _10 point deduction per question_ for the first offense, a _"0" on the entire exam_ for the second offense, and _possible expulsion from the course_ following review by the instructor in consultation with an administrative-instructional committee for the third offense.

If students have questions about this policy, they should contact their instructor. Failure to understand this policy regarding violations of academic integrity will not excuse any student from its consequences. In the enforcement of the policy, **no notification is needed between occurrences**. If three occurrences are found in your course prior to your instructor grading your work, each occurrence will be treated as an individual case, and the enforcement will apply as shown above.

For example: If you take two exams before your instructor has time to review your work and there are violations on both exams, you will receive a 10 point deduction per question involved in the first exam, and a zero for the second exam. If you have any question about the work you submitted, we recommend that you wait until your instructor has had time to grade your exam prior to taking another one.

- Review the Student Handbook for more specifics. If you have any questions regarding the academic integrity policy, please consult your instructor **<u>prior</u>** to taking module exam one.

OFFENSE	DEFINITION	ACTION
AV-T1: _Academic Violation - Tier 1_	**Academic Violation- Tier 1** occurs when a student commits their first act of academic dishonesty NOT on camera- for example: ✓ answer is word for word from the module or answer key ✓ submits problem with numbers that weren't a part of the question ✓ or uses methods not taught in the course.	10-point deduction per question
AV-T2: _Academic Violation - Tier 2_	**Academic Violation- Tier 2** primarily occurs in these two scenarios: 1.) The student commits their _second act of academic dishonesty_ as described in Academic Violation- Tier 1 _or_ 2.) The student commits their first act of academic dishonesty ON CAMERA- for example: ✓ uses notes	0 on the exam

	✓ has a device in the testing area ✓ blocks the camera ✓ leaves the testing space ✓ talks to someone about the exam, or another person is heard providing responses to the exam questions	
AV-T3: *Academic Violation - Tier 3*	**Academic Violation- Tier 3** primarily occurs in these two scenarios: 1.) The student commits their <u>*third act*</u> of academic dishonesty as described in Academic Violation- Tier 1 *or* 2.) The student commits their second act of academic dishonesty ON CAMERA as described in Academic Violation- Tier 2	Dismissal

Participation Policy: In the online environment, participation is marked by the completion of an *academic event* in <u>*each week*</u> of the course; details are outlined within the course schedule, which will be provided via email prior to the start date. Academic events include, but are not limited to, submission of a class assignment or completion of a quiz/exam.

- **If no academic event is completed within Week 1 of a course, the student will be administratively withdrawn from the course**. Beyond the first week, if an academic event is not completed as outlined in the course schedule, the student will be considered as having not participated in that week of class.

- **If a student does not complete an academic event for two consecutive sessions, the student will either be administratively withdrawn from the course or will receive a final course grade of F**, depending on how much of the course has transpired at the time of the second week of non-participation.

- For more details, please review Geneva – Portage Learning Student Handbook.

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, non-proctored 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.

Module Descriptions

Module 1:   This module introduces both descriptive and inferential statistics. The differences between these types of statistics will be discussed, as well as the purpose of each. Quantitative and qualitative data will also be discussed, as well as the various types of variables and scales of measurement.

Module 2:   This module will discuss the different types of graphs and data distributions and will specifically focus on frequency distributions. The concept of central tendency will be presented, as well as measures of central tendency, including mean, median, and mode. Measures of variability, including range, variance, and standard deviation will also be discussed.

Module 3:   This module will focus on sampling techniques and calculating probability. Several different techniques for sampling will be presented and the concept of bias will be introduced. Content will include discussions of sampling distributions, the Central Limit Theorem, and calculations of probability. An introduction to hypothesis testing is also contained in this module and will cover the topics of forming hypotheses, hypothesis testing logic, and differentiating between Type I and Type II errors.

Module 4:   This module will focus on the importance of standardizing scores and hypothesis testing with z-scores. The concepts of the standard normal curve will be discussed. Content includes steps in calculating z-scores from raw scores (and vice versa), using the z-table, all steps involved in a z-test, and confidence intervals, effect size, and statistical power in relation to the z-test.

Module 5:   This module explores hypothesis testing with the *t* statistic. One sample, paired samples, and independent samples *t* tests will be defined, and the steps involved in each test will be explained. Use of the *t* table, as well as confidence intervals and effect size calculations in relation to *t* tests will also be highlighted.

Module 6:   This module will focus on hypothesis testing through analysis of variance (ANOVA). Content includes within-group and between-group variance, using the *F* table, differentiating between a one-way and two-way ANOVA, and the steps involved in each type of ANOVA.

Module 7:   This module will discuss correlational and regression analyses. The strengths and limitations of correlational analyses will be described, and positive and negative correlations will be defined. The steps involved in calculating Pearson's *r* and in performing linear regression will be defined. The basics of multiple regression will also be presented.

Module 8:   The module will highlight when it is appropriate to use non-parametric testing. Specifically, chi-square analysis will be discussed, and all the steps involved in goodness-of-fit and tests for independence will be defined.

Applied Project Descriptions

AP 1:   In this applied project, students will gain experience with the jamovi statistical software and with preparing various types of statistical graphs from a provided dataset.

AP 2:   In this applied project, students will construct frequency distributions and will learn how to calculate measures of central tendency and variability using statistical software.

AP 3:   In this applied project, students will learn how to analyze a provided dataset and calculate probability within the sample dataset.

AP 4:   In this applied project, students will learn how to perform the steps of a z-test and properly report results and conclusions.

AP 5: In this applied project, students will gain direct experience performing one sample *t*-tests, paired sample *t*-tests, and independent samples *t*-tests. Proper reporting will also be discussed.

AP 6: In this applied project, students will gain experience performing one-way ANOVA and two-way ANOVA, as well as post hoc tests.

AP 7: In this applied project, students will learn how to perform calculate Pearson's *r* using statistical software and will conduct a linear regression analysis.

AP 8: In this applied project, students will perform several chi-square analyses, including both goodness-of-fit and tests for independence.

Required Projects and Assignments:

For the applied projects component of this course, students will gain direct experience conducting statistical analyses with the free statistical software jamovi (https://www.jamovi.org/). Students will be provided with datasets for each project, along with instructions on how to complete the assigned analyses for each type of statistical test discussed throughout the course. Once each analysis is completed, students will upload their statistical results and conclusions.

Grading Rubric:

Check for Understanding	1 pt.
8 Module Exams = 100 pts. each x 8 =	800 pts
8 Module Review Sets = 5 pts. each x 8 =	40 pts
8 Applied Projects = 20 pts each x 8 =	160 pts
Final exam = 120 pts.	120 pts.
Total	1121 pts.

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:

- Susan A. Nolan & Thomas Heinzen, **Statistics for the Behavioral Sciences**, Worth Publishers.
- Garrett Foster, David Lane, David Scott, Mikki Hebl, & Rudy Guerra, **An Introduction to Psychological Statistics,** Open Educational Resources Collection

NOTE: We do not support the use of outside resources to study, except the ones 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.com. 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
Memorial Day	Independence Day
Labor Day	Thanksgiving weekend
Christmas Break	

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

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.com.

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.