

MAT 110: Probability and Statistics



3 Credits

Lecture

Hybrid

Instructor Name: Joshua Harrington

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Online Office Hours: Monday 1-2pm, Tuesday 9-11am, Friday 7-8am

<https://tinyurl.com/Dr-Harringtons-office-hours>

Course Description:

This course examines the collection, organization, analysis, and interpretation of data in the context of applications from such fields as business, education, political science, economics, psychology, sociology, nutrition, and medicine. The importance of experimental design and sampling techniques are studied and stressed throughout the course. Elementary probability theory is introduced as well as the following theoretical distributions: binomial, normal, Student's t, and chi-square. Linear regression techniques and correlation analysis are used to study bivariate populations. An algebra background is required as well as a scientific or statistical calculator.

Course Textbooks and Resources:

- (optional) Understanding Basic Statistics, 8th Edition, Brase & Brase (ISBN: 9781337558075)
- (required) WebAssign access code for the textbook (ISBN: 8220118196910)
- (required) Scientific calculator

Course Student Learning Outcomes

Upon successfully completing this course, students will be able to:

1. Examine how statistics can be distorted and misused.
2. Emphasize ways information can be simplified and described.
3. Understand the importance of experimental design and sampling techniques as they apply to the student's chosen discipline and research interests.
4. Explore useful methods of making predictions based upon available information considering elementary probability theory and the following important theoretical distributions: binomial, normal, Student's t, and chi-square.
5. Study bivariate populations through linear regression and correlation analysis.

Assessment of Student Learning Outcomes:

Student learning outcomes will be assessed through a series of assignments including:

- Homework
- Progress Checks
- Exams
- Final

Course Assignment Descriptions:**Homework:**

Homework will be assigned on WebAssign. To access WebAssign, find the “Access WebAssign” link in the Canvas modules. If you have never used WebAssign before, you will need to create a new account.

The first time you log in, you will need to click the “Purchase Access now” button at the top right. You will then be prompted to register a prepurchased access code or purchase a new access code.

It is your responsibility to know when homework is due and have it completed on time. Except for the first day of class, you will have homework due every Monday of the semester.

Progress checks and review:

Class time each Friday of the semester will be used as review time and to complete progress checks on Canvas. Collaboration on progress checks is encouraged.

Exams:

There will be three exams throughout the semester. Exams will be administered online through WebAssign. Unlike the homework, Exams must be completed in a single one-hour sitting. Each question on the exam may only be attempted once.

Exams can be started any time between the open and close date/time. Exams must be completed within 1 hour of the start time. Exams must be completed alone; collaboration is not allowed.

Final Exam:

The final exam for this class will be administered on WebAssign. The final exam must be completed in a single three-hour sitting. Each question on the exam may only be attempted once.

Course Grading Policy:

Your grade in the course will be based on your performance on three exams, a final, progress checks and homework. No extra credit will be given in this class. Grades will be weighted as follows:

Tests and final: 20% each

Progress checks: 10%

Homework: 10%

Course Grading Scale	
Grade	Percentage Range
A	$93 \leq X \leq 100$
A-	$90 \leq X < 93$
B+	$87 \leq X < 90$
B	$83 \leq X < 87$
B-	$80 \leq X < 83$
C+	$77 \leq X < 80$
C	$73 \leq X < 77$
C-	$70 \leq X < 73$
D+	$67 \leq X < 70$
D	$60 \leq X < 67$
F	$X < 60$

Attendance & COVID-19:

Any student experiencing symptoms of COVID-19, with a suspected or positive diagnosis of COVID-19, or with known exposure to COVID-19 is not permitted to attend class in person. Students who are absent for such reasons may choose to participate as their health permits in synchronous online class meetings. Class absences due to COVID-19 symptoms, diagnosis, or exposure will not be penalized. Students should contact their instructor if they have questions regarding how to access required academic material (such as lectures) and complete assignments during such absences.

Absence notifications from the Dean of Students are not required for these absences. Students should refer to the Communicable Disease Policy for guidance regarding when they may return to class after a COVID-19-related absence.

COVID-19 Symptoms, Exposure, or Diagnosis:

Students are required to monitor their symptoms daily through Healthy Roster. Traditional students who are experiencing symptoms or believe they may have been exposed to COVID-19 should call Student Health Services for guidance. SAGE students should contact their medical provider for guidance. Any student with a positive diagnosis of COVID-19 or with known exposure to COVID-19 must report that fact to Health Services (610-606-4640 or 610-437-4471, ext. 4640; <https://www.cedarcrest.edu/healthservices/>).

Class Cancellation Policy:

For notification of the College closing, for inclement weather or other emergencies, refer to Cedar Crest's e2Campus system, the Inclement Weather Hotline at 610-606-4629, or the College's MyCedarCrest website for notification.

In the event that class is canceled by the instructor, a class-wide email will be sent to notify students of the cancellation.

Delivery of Instruction:

This course will provide instruction to students through both in-person and online means. Students will be able to demonstrate the learning outcomes of the courses through both in-person and online activities. Please refer to the College's Information Technology Support Center for information regarding required general computing resources to access online instruction, including Canvas (online Learning Management System) and Internet access (<https://www.cedarcrest.edu/infotech/>).

Students who choose to participate in online instruction for all of their face-to-face or hybrid courses must complete the Online Instruction Intent Form in the Canvas course COVID-19 Resources for Students.

Class Recording:

Classes may be recorded by instructors in both in-person and online formats. Students will be notified in advance if classes are being recorded. These recordings may be made available through the course website in Canvas (the College's Learning Management System). These recordings are used for educational purposes only and may not be shared with anyone else or posted anywhere online (outside of the Canvas course site). The dissemination of class recordings other than in Canvas is only permitted with the speaker's (including any identifiable student on the recording) explicit written permission.

Student recordings of class must have prior instructor approval and are prohibited except for the purposes of an individual student making the recording to achieve course learning outcomes (e.g., a student studying lecture material to prepare for an exam). Other students must be notified in advance if classes are being recorded; therefore, students should receive permission from an instructor to record class and the instructor will provide notice to other students that the course is being recorded. Such student recordings may not be disseminated or shared without explicit instructor approval in addition to the explicit written permission of any speaker (including any identifiable student on the recording). Students with approved accommodations may also be permitted to record lectures in this course in order to be provided meaningful access to the lecture material and to the educational experience and such requests are handled in accordance with the College's policies and procedures.

Note: Recordings may be prohibited, at the instructor's sole discretion, during portions of lectures or discussions that may involve personal, self-disclosure by other students. Instructors may also prohibit recordings to ensure the academic integrity of assignments (e.g., during reviews of exam answers). Please see your instructor if you have any questions or concerns about this policy.

Technology Support Resources:

Please refer to the Information Technology Support Center website and the IT HelpDesk for Cedar Crest College computer, software, and other technology resources available to students. The IT Support Center resources are available at the following website:

<https://cedarcrest.teamdynamix.com/TDClient/Home/>.

The IT HelpDesk is located at the Bridge of the Student Success Center on the main floor of Cressman Library (610-606-4635 and helpdesk@cedarcrest.edu).

Tutoring and Academic Support Resources:

The Student Success Center, located on the main floor of Cressman Library, offers writing and tutoring resources to all Cedar Crest students with the goals of assisting students in achieving academic success and becoming effective, independent learners. Smarthinking, on-line tutoring service, is also available to all Cedar Crest students. For information about all available tutoring services and scheduling information, please refer to the Tutoring and Support Resources page on MyCedarCrest, located under the “Academic Services” page in the “Current Students” Section:

my.cedarcrest.edu/ICS/Current_Students/Academic_Services/Tutoring_Support_Resources.jnz.

The Student Success Center may also be contacted at 610-606-4628 or advising@cedarcrest.edu.

Cedar Crest College Honor Philosophy:

The Cedar Crest College Honor Philosophy states that students shall uphold community standards for academic and social behavior to preserve a learning environment dedicated to personal and academic excellence. It is based upon the principle that, as a self-governing body, students have the ability to create an atmosphere of trust and support. Within this environment, individuals are empowered to make their own decisions, develop personal regard for the system under which they live, and achieve a sense of integrity and judgment that will guide them through life.

Cedar Crest College Diversity Statement:

Founded under the mission to expand women’s access to higher-education, Cedar Crest College values difference in a diverse, inclusive, and equitable learning environment. The College is committed to educational excellence, leadership, and civic engagement in a pluralistic society. We thus embrace an inclusive community that brings together students, faculty, and staff of different racial and multi-racial, ethnic and multi-ethnic, gender and sexually diverse, religious and nonreligious, economic, and national identities and ages. Our educational mission includes students who have been historically underrepresented in higher education, such as students of color, first-generation college students, international students, students of varying ability or disability, and other identities.

Classroom Protocol:

Cedar Crest College maintains a classroom and learning environment dedicated to scholarly, artistic, and professional inquiry. The College's community of learning is founded upon the intellectual freedom of students and faculty in pursuit of knowledge and understanding. Such an environment depends upon the insights of the liberal-arts disciplines, as well as a respect for the global diversity of viewpoints and cultural backgrounds.

The college expects students to conduct themselves in a manner that best realizes their own and other students' education, as consistent with the Cedar Crest College Honor Code. Appropriate classroom behavior includes, but is not limited to, the expectations for students: to attend and be prepared for all classes, to arrive and leave on time, to treat the faculty members and other students with respect, to refrain from any activities within the classroom that do not directly pertain to the business of the class, to use language that is respectful and non-abusive, and to otherwise refrain from any behavior that disrupts or jeopardizes the learning environment as determined by the instructor and departmental guidelines, as appropriate to the educational goals of the learning environment.

Academic Integrity:

Academic integrity and ethical behavior provide the foundations of the Cedar Crest scholarly community and the basis for our learning environment. Cedar Crest College expects students to set a high standard for themselves to be personally and intellectually honest and to ensure that other students do the same. This standard applies to all academic work (oral, written or visual) completed as part of a Cedar Crest education.

Cedar Crest College reserves the right to define, in its sole discretion, what constitutes academic misconduct. Examples of academic misconduct include, but are not limited to, cheating, plagiarism, collusion, falsification, sabotage, and impersonation. This list is not exhaustive, and other acts in violation of the Cedar Crest Honor Code or academic standards of integrity may be deemed academic misconduct by an instructor or by the college.

Students who violate these standards are subject to sanctions imposed by the course instructor, department chair, the Provost's office, or the Board of Trustees. In this course, instances of academic conduct will result in a grade of zero on the assignment.

When an instructor determines that a student has engaged in academic misconduct, the instructor is obligated to report the incident to the Provost's office. Reports are recorded in the Provost's office, which will notify the student of their receipt and the College's policies regarding academic misconduct. For more information, please refer to the Student Handbook, Section IV: Community Standards for Academic Conduct.

Resources for Students with Disabilities:

Cedar Crest College is committed to ensuring students with disabilities are welcomed as a part of our diverse community and that they have equal access to participate in all programs and services offered by the College, in accordance with the Americans with Disabilities Act (ADA) and Section 504 of the National Rehabilitation Act. If you have a disability and require accommodations to access any portion of the design, instruction, or experiences that comprise this course or any other campus activity, please contact Disability Resources (610-606-4628; advising@cedarcrest.edu; Student Success Center in Cressman Library) to set up an appointment to discuss your need for accommodations. Please note that accommodations are not retroactive and may require advance notice to implement. Please refer to the Disability Resources page on MyCedarCrest for more information (https://www.cedarcrest.edu/ada_file.shtm).

Accommodations will not be provided unless the instructor receives an official Cedar Crest College Accommodations Letter. If you are already receiving accommodations, please remember to have a confidential conversation (in person, via email, or phone call) with your instructor to discuss the approved accommodations you intend to use for this course and how they may be implemented.

Tentative Topics and Schedule:

- Chapter 1: 1.1 What is Statistics
 1.2 Random Samples
 1.3 Experimental Design
- Chapter 2: 2.1 Histograms
 2.2 Other Graphs
- Chapter 3: 3.1 Measures of Central Tendency
 3.2 Measures of Variation
- Chapter 4: 4.1 Scatter Diagrams
 4.2 Linear Regressions

Test 1 (Chapters 1-4)

- Chapter 5: 5.1 Introduction to Probability
 5.2 Addition and Multiplication Rules for Probability
 5.3 Probability and Counting Methods
- Chapter 6: 6.1 Probability Distributions
 6.2 Binomial Distributions

Test 2 (Chapters 5-6)

- Chapter 7: 7.1 and 7.2: Normal Curves
 7.3 and 7.4: Sampling Distributions
- Chapter 8: 8.1 Estimating μ
 8.2 Estimating μ when σ is unknown
 8.3 Estimating True proportion
- Chapter 9: 9.1 Introduction to Statistical Tests
 9.2 Testing the Mean
- Chapter 11: Chi-squared Test

Test 3 (Chapter 7-9, 11)

Cumulative Final Exam

