

Math 120 - Elements of Statistics

Spring 2021

Instructor: Prof. Miller

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Office: Olin 214

Office Hours: By appointment (Don't be shy! Just give me 24hrs notice.)

Course Description This course is an introduction to methods of collecting and analyzing data to solve real world problems. The goal is to use mathematics on properly constructed data samples to make precise probabilistic statements about real world variables. We will also learn to interpret the limitations and practical applications of these probabilistic statements in real world contexts.

Topics include experimental design, summary statistics, basic probability, distributions of sample statistics, hypothesis testing, confidence intervals, single and multivariable regression, ANOVA, and goodness of fit tests.

Calculator A two-line scientific (or graphing) calculator is **required** for this class. Bring it every day. Any inexpensive two-line display scientific will work; you can get one for less than \$15 on Amazon or elsewhere. **Smartphones may never be used as a calculator.**

Textbook *OpenIntro Statistics* by Diez, Barr, and Cetinkaya-Rundel. 4rd Ed. Available for free at <https://www.openintro.org/book/os/>.

Online Resources: Our class Notebowl page, and my teaching website: millera2.github.io

Grading Students earn their grade by completing in-class quizzes each week, submitting HW assignments bi-weekly to Notebowl, and taking a midterm exam. In addition, there will be a final exam. The final grade will be computed according to the following weights:

Distribution:

Category	Quizzes	HW	Midterm	Final Exam
Weight	50%	10%	20%	20%

Grading Scale:

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
>97	>93	>90	>87	>83	>80	>77	>73	>70	>67	>63	>60	<60

Participation and Attendance Policy Participation and attendance in Math 120 are essential, mandatory, and non-negotiable. Students with poor participation or attendance may be subject to a grade penalty at my discretion. Appropriate considerations will be made for quarantined students on a case-by-case basis.

Quizzes Every Tuesday, students will take a quiz on the material from the previous week. Questions are a mix of free-response and multiple choice. A calculator is required. All quizzes are completed remotely on NoteBowl. **Students must work individually on all quizzes.**

I drop the lowest quiz score. **There are no opportunities to “make up” missed quizzes;** missed quizzes will result in a score of zero for that quiz.

Exam There is a midterm exam on **March 15**. It will cover all course material covered in the first half of the course. Students will take the exam remotely on NoteBowl. This exam cannot be dropped from the final grade. **Students must take the exam individually. Cooperation is a violation of academic integrity.**

Final Exam There is a cumulative final exam in 120. Details on the coverage of the quiz will be discussed later in class. Students must take the final exam in order to pass Math 120.

Homework Students will complete bi-weekly homework assignments, due every other Friday by 8am. HW descriptions will be posted to Notebowl. These assignments may require the use of the statistical software covered in class (in particular, the Google Sheets spreadsheet app).

All HW assignments will be submitted to Notebowl. To earn credit for the assignment, HW must be submitted in the file format specified in the HW description. Late HW will receive a score of zero.

Tentative Schedule of Topics Covered

Week	Topic	Week	Topic
1-2	Descriptive Statistics and Data Visualization	9-10	Inference for means and proportions
3-4	Linear Regression	11-12	Error and Power in Hyp Tests,, χ^2
5-6	Probability Distributions	13-14	ANOVA, Inference on Lin. Reg.
7-8	Inference and Hyp Test Basics		

Academic Integrity Proposed and developed by Denison students, passed unanimously by DCGA and Denison's faculty, the Code of Academic Integrity requires that instructors notify the Associate Provost of cases of academic dishonesty. Cases are typically heard by the Academic Integrity Board which determines whether a violation has occurred, and, if so, its severity and the sanctions. In some circumstances the case may be handled through an Administrative Resolution Procedure. Further, the code makes students responsible for promoting a culture of integrity on campus and acting in instances in which integrity is violated.

Academic honesty, the cornerstone of teaching and learning, lays the foundation for lifelong integrity. Academic dishonesty is intellectual theft. It includes, but is not limited to, providing or receiving assistance in a manner not authorized by the instructor in the creation of work to be submitted for evaluation. This standard applies to all work ranging from daily homework assignments to major exams. Students must clearly cite any sources consulted—not only for quoted phrases but also for ideas and information that are not common knowledge. Neither ignorance nor carelessness is an acceptable defense in cases of plagiarism. It is the student's responsibility to follow the appropriate format for citations. Students should ask their instructors for assistance in determining what sorts of materials and assistance are appropriate for assignments and for guidance in citing such materials clearly. For further info about the Code of Academic Integrity, see <http://Denison.edu/academics/curriculum/integrity>.

Disabilities Any student who feels he or she may need an accommodation based on the impact of a disability should contact me privately as soon as possible to discuss his or her specific needs. I rely on the Academic Support & Enrichment Center in 104 Doane to verify the need for reasonable accommodations based on documentation on file in that office.

ARC Accommodations: Students with ARC accommodations **must inform me in person, at least one week in advance of a quiz or exam** to receive extended time on that assignment. If a student informs me of their accommodations less than a week in advance, their opportunity for extended time will not be available until the quiz **after** the upcoming one.

Appropriate Use of Course Materials The materials distributed in this class, including the syllabus, exams, handouts, study aids, and in-class presentations, may be protected by copyright and are provided solely for the educational use of students enrolled in this course. You are not permitted to redistribute them for purposes unapproved by the instructor; in particular you are not permitted to post course materials or your notes from lectures and discussion on commercial websites. Unauthorized uses of course materials may be considered academic misconduct.

Covid Clause Due to the unpredictability of the COVID-19 pandemic, this syllabus is subject to change in response to public health concerns at my discretion. Students will be notified of any change both in class and by email.