

## Math 102: Elements of Statistics

### Course Syllabus

#### General Info:

Professor	Joan Krone
Office	Lisska Center (Gilpatrick House)
Office Hours	M 8:30, 10:30, T 9-9:30, 10:30, W 8:30, 2:30, Th 12:30, F 8:30, 10:30 Other times by appointment
Email	krone@denison.edu

Textbook	<i>Introduction to Statistics &amp; Data Analysis, 5th Ed.</i> by Peck, Olsen and Devore. This is an e-book.
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#### Course Description:

The *language* of a democratic society is increasingly one of data and its analysis. An introductory course in statistics is one of the most important, impactful and relevant courses for a liberally educated student of the 21st Century. To discern emerging trends, to convince people of your point of view, to treat people with equity, to distinguish good political positions from flimsy ones all require you to be able to understand the arguments of statistics and to be able to apply them in your own life.

This course is fundamentally about the interpretation and analysis of data. We will examine collections of numbers and draw inferences about what those numbers say for the world in which we live.

This course is simultaneously about big important ideas and also small equally important details. It is not enough to merely memorize equations or word problems (details) because the bigger ideas inform *how* and *where* to apply those equations. Without a firm grasp of the fundamental ideas, you would most likely be using the wrong tool or technique for the job and therefore forming erroneous conclusions about your data. Similarly, it is not sufficient to know only the big ideas. While the fundamental concepts are important, the details allow us to actually use those important ideas to do good work. The big ideas and the important details always go hand in hand. If you can see how they relate, then you will find they support each other – learning the both parts as a whole is much easier than learning both parts separately.

## Our TextBook

This course uses an e-book (electronic textbook) which is about half the cost of a print textbook. At the Denison Bookstore, you can buy a key which will allow you to access the class textbook and online resources. Most of the homework assignments are done online through our course textbook website, so you will not be able to complete the assignments without purchasing access to the e-book. I recommend that you bring a laptop or tablet to class so that you can access the book during our in-class activities.

When you purchase the text key, you will go to the following website: <https://www.webassign.net>.

At the top of this page is a button that says *Enter Class Key*. You will click here and enter the following:

denison 4012 6327

You will then be asked to create a web assign account (or choose one you already created).

Our text is quite large – almost 1000 pages of reading for the semester. However, it is not dense. That is, there are not as many difficult concepts per page as you would find in a normal mathematics text. Our book features a lot of diagrams, pictures and other visual depictions of the concepts. It also has many sample problems to illustrate the key concepts.

Mathematically, the material in statistics is quite elementary; it is almost entirely addition, subtraction, multiplication and division. There is no calculus, little if any algebra, no trig, not really any proofs. This class is not difficult for its mathematical sophistication. It is, however, accumulative. So it is important to learn each concept well before moving on. If you do not have a firm foundation of the current concepts, then your tower of knowledge will "topple" after you try to add another layer or two.

Some students do not like to read an e-book. Other students desire to keep a permanent copy of the book (the e-book expires at the end of the term). You may also purchase a hard copy of the textbook, but you will definitely need the e-book access so you can do online homeworks. If you buy a hardcopy to go along with the e-book, you can probably get by with the 4th edition. I've seen used copies of the 4th edition for less than \$9 online.

## Units

The course is designed around five different units, each of which introduces a key statistical concept.

Unit	Text Chapters	Weeks
Experimental Design and Describing Data	2-5	1-3
Probability and Distributions	6,7	4-5
Sampling and Estimation	8,9	6-8
Hypotheses	10,11	9-11
Comparing Populations	12,13	12-14

Each unit will take 2 or 3 weeks of our class time.

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Specific details of assignments, including homework, quizzes, and exams will be given in class.

During the second part of the semester, each student will design and complete a project, details for which will be announced.

## A Guideline to Course Success

If you follow these guidelines, you should be able to earn an A or B in this class without difficulty, and more importantly, learn some valuable concepts that will serve you well throughout your professional life.

- **Take the Time.** The key challenge for this class (as with most Denison classes) is time management. You will need to invest time outside of class (about 8 hours per week or more) in order to be successful. You have an excellent textbook and you get immediate feedback on your web assignments. Reading your assignments carefully will make the work easy.
- **Do the Reading.** We cover nearly 1000 pages of material in the book over the course of the semester. You must do the assigned reading on the dates it is assigned to be successful.
- **Quiz = Free Feedback.** Quizzes are designed to offer you feedback on your learning. Quiz questions are generally similar to exam questions and stress the most basic and fundamental aspects of the course. If you are doing well on quiz questions, you should feel confident heading into an exam.
- **Homework = Free Reinforcement.** We use homework questions assigned on

webassign. These are not difficult but will take some time. There is no reason you should not earn 100% on the homework questions (you are allowed to go back to fix mistakes).

- Practice for Tests. Tests are your opportunity to demonstrate that you know the key concepts. To do well on the tests, don't just review problems – actually practice solving problems without looking at the answer. Many exam problems will come from our quizzes, homework and our in-class exercises. Practice doing these same problems over and over again to be sure you know them well.
- Attend Class. Come to every single class. In addition to a few clarifying lectures, we will spend lots of in-class time doing example problems, both individually and in small group settings.

#### Grading:

Homework	15%
Quizzes	15%
Tests	30%
Project	15%
Final	25%