

MTH 243 INTRODUCTION TO STATISTICS

Instructor: Zack Reed
Email: reedz@linnbenton.edu

Term: Spring 2020
CRN: 44026

STATISTICS enable us to answer research questions with data. We summarize or visualize data that we've observed; we use data from a sample to infer properties of the population from which the sample was drawn; we predict the values of future observations based on what we've learned from the data on hand. In this era of "big data," computational proficiency has become essential to the study of statistics. For that reason, we will learn how to make use of the R statistical programming language.

Student Learning Outcomes

1. How to perform, and under what conditions you can use, the most common frequentist hypothesis tests
2. Programming in the R language
3. Draw and interpret statistical plots
4. Elementary experimental design and sampling
5. Elementary linear and generalized linear modeling

Materials

- ◆ Computer with R and RStudio installed.
- ◆ Free online textbook:
Diez, Çetinkaya-Rundel, and Barr. *OpenIntro Statistics*. 4th ed., Leanpub, 2019.
<https://leanpub.com/openintro-statistics>

Moodle

Lectures, notes, homework, and grades will be made available on Moodle. Although we are now entirely online, I've kept the schedule as I planned it for the on-campus version. Each week has a Tuesday section and a Thursday section. I'll post recorded lectures and class notes for each day, before each day. Ideally, you'll complete all readings and view all lectures by those days, but you're free to work at any time during the week. Only your weekly homework has a due date.

Homework

Homework is due Sunday night at 11:59 PM each week. It will consist of both written work and R programming. You will need to submit it through moodle as either a .doc or .pdf. You may have to incorporate photos or scans of handwritten mathematics. Please make sure that you always show all work, and that it is legible.

Projects

Instead of proctored exams, there will be two projects where you will analyze some data and write up your results. Details forthcoming.

Participation

The video lectures contain interactive quizzes. Your answers are recorded. Now and then, I may also assign small tasks for you to complete. You won't get a score for these, instead your grade for this portion of the course will be all-or-nothing: if, at the end of the term, your overall score on these tasks is over 50%, you will receive 100% for your participation score. If your score is lower than 50%, your participation score will be 0.

Grading Policies

<i>Category</i>	<i>Percent of Grade</i>	<i>Grading Scale</i>
Homework	60%	A 90–100%
Projects	30%	B 80–89.9%
Participation	10%	C 70–79.9%
		D 60–69.9%
		F 0–59.9%

Help

Learning to write code can be a frustrating experience. If you've spent more than half an hour trying to get a piece of code to run, **GIVE UP** and send me an email with your code attached. There's a forum for students to ask questions. The link is posted at the top of the moodle page. If you have a question about code or homework, please post it there. Please try to answer others' questions when you can.

Readings

Readings will be posted for each day. A tentative reading schedule is posted at the end of this syllabus. You may notice that some seem very long, and others are very short. The book has a lot of plots and diagrams, so sometimes 30 pages is much shorter than it seems. At other times, we will be covering fairly complex material, and the pages will be fairly dense. The readings indicate the topics I'll be covering in the lectures.

Special Circumstances

LBCC is committed to inclusiveness and equal access to higher education. If you have approved accommodations through the Center for Accessibility Resources (CFAR) and would like to use your accommodations in this class, please talk to your instructor as soon as possible to discuss your needs. If you think you are eligible for accommodations but are not yet registered with CFAR, please visit the [CFAR Website](#) for steps on how to apply for services. Online course accommodations may be different from those for on-campus courses, so it is important that you make contact with CFAR as soon as possible.

LBCC Comprehensive Statement of Nondiscrimination

LBCC prohibits unlawful discrimination based on race, color, religion, ethnicity, use of native language, national origin, sex, sexual orientation, gender, gender identity, marital status, disability, veteran status, age, or any other status protected under applicable

federal, state, or local laws. For further information see Board Policy P1015 in our Board Policies and Administrative Rules. Title II, IX, & Section 504: Scott Rolen, CC-108, 541-917-4425; Lynne Cox, T-107B, 541-917-4806, LBCC, Albany, Oregon. To report: https://linnbenton-advocate.symplicity.com/public_report

	<i>Tuesday</i>	<i>Thursday</i>
<i>Week 1</i>	Intro to Statistics, Sampling OIS: 7–35	Summarizing Data OIS: 41–78
<i>Week 2</i>	Probability OIS: 80–108	Probability and the Normal Distribution OIS: 115–141
<i>Week 3</i>	The Central Limit Theorem OIS: 251–252	<i>t</i> -test OIS: 252–258
<i>Week 4</i>	Confidence Intervals	More <i>t</i> -test OIS: 262–277
<i>Week 5</i>	Binomial Distribution OIS: 149–152	More Binomial Distribution OIS: 149–155, 181–186
<i>Week 6</i>	χ^2 test OIS: 229–238	Bootstrapping
<i>Week 7</i>	More Bootstrapping	Linear Regression OIS: 305–337
<i>Week 8</i>	Multiple Linear Regression OIS: 343–370	Logistic Regression OIS: 371–381
<i>Week 9</i>	ANOVA OIS: 285–291	More ANOVA OIS: 292–294
<i>Week 10</i>	Bayes OIS: 106–108	More Bayes

OIS = *OpenIntro Statistics*

The instructor reserves the right to make changes to the syllabus/calendar at any time.