STAT 113: Introduction to Statistics

Spring 2022 Oberlin College

Lecture Information:
Meeting Times:

- *Section 3:* MTWF, 11:00–11:50 AM
- *Section 4:* MTWF, 1:30–2:20 PM

Location: Science Center A255

Instructor:
Nathan Gray
Office: Rice 103
Office Hours: TBA
Email: `ngray@oberlin.edu`

Prerequisites: STAT 113 is intended to be a first course in statistics. It assumes no prior exposure to the subject. It is likely to be a very useful course even to students that took statistics in high school, since the course will delve deeper into the concepts than most high-school AP classes. However, *those students that either have a score of 3 or above on the AP Statistics exam or have a strong mathematics background should consider taking STAT 205 instead* (205 begins with the same topics as 113, but it moves at a faster pace).

Course Description: This is a statistics course and *not* a mathematics course. The purpose of the course is to understand what data is telling you (and not telling you) and why (or why not), and also to be able to communicate that information to others.

Students taking this course have often reported that it is somewhat like a hybrid between a STEM course (science, technology, engineering, mathematics) and a humanities course, requiring both quantitative and qualitative thinking. Most of the work assigned will consist of written sentences explaining thought processes and justifying conclusions, while relatively little will consist of manipulating mathematical equations.

Some of the concepts in statistics can be subtle, even when the calculations involved are simple. Thus, much time (in class and on assignments) will be devoted to understanding those nuances and to examining the thought processes involved.

Textbook (required): *Statistics: Unlocking the Power of Data,* by Lock et al., 3rd ed., Wiley, 2021. We will follow the book closely, covering much of Chapters 1–10 (some sections will be omitted).

Grade Items:

Exams: There will be three midterm exams and a final exam.

Homework: There will be (almost) weekly homework assignments. Each homework must be submitted through Gradescope (see page 2). The lowest two homework grades will be dropped at the end of the semester.

Students are expected to complete the assignments on their own. However, collaboration with classmates *before the write-up* is acceptable and encouraged, as long as each student writes and submits their own work. (See page 3 for more information about homework collaboration.)

Participation: This will be based on labs and worksheet completion.

There will be (almost) weekly lab sessions beginning in the third week. Some labs will involve the use of RStudio, which can be done either in a web browser through the Oberlin RStudio server or on one's own computer (see page 2).

Grading Policy: Course grades will be based on the grade items above. Every student's grades are a reflection of the student's mastery of the course material and the student's ability to communicate that mastery through written work.

Earning 90%, 80%, and 70% of the total points in the course will guarantee course letter grades of *at least* A−, B−, and C−, respectively. The boundaries (cut-offs) between letter grades

Category	Grade Basis	Weight (each)	Weight (total)
Homework	lowest two dropped		20%
Participation			5%
Exams (×3)	lowest dropped	25%	50%
Final Exam			25%
Total			100%

may be relaxed at the instructor's discretion, depending on the distribution of course numeric grades. This grading scheme rewards hard work, leaving little room for miraculous recovery.

Technology:

Google Drive folder: All course materials will be posted there.

Gradescope: This course will use the website Gradescope in order to provide fast and accurate feedback on students' work.[1] Except for any in-class work, all other grade items will be submitted and graded through Gradescope.

RStudio: The lab component of the course will introduce computational techniques using the free and open-source statistical language R, which is one of the most popular computing languages used by statisticians and data scientists. No prior programming skills will be required or expected.

Working with R directly, however, can be difficult. Fortunately, there is a free interface, called RStudio, that allows one to compute with R more easily.[2] Options for using RStudio:

- Option 1: Log in to the Oberlin College RStudio server from a web browser.[3] An account on the server will be set up for students, at which point access to the server will be available for the entire semester.
- Option 2: Install the software on your own computer.

Either option will suffice, though Option 2 might be best.[4] Instructions for each option will be given later.

StatKey: This is a collection of free interactive tools that is available on the Internet and is fully integrated with the textbook.[5] It is used to illustrate key ideas and to provide support for computer-intensive procedures. The book mentions the use of *StatKey* every so often, particularly in examples and problems. In fact, each dataset that is analyzed in the book is electronically available in multiple formats in *StatKey*.

Course Help:

- *Reading:* The relevant material should be read *before* lecture. Try to read and understand every statement mentioned in all of the examples. If necessary, reread the same material after lecture.
- *Homework:* Begin it immediately after lecture, doing as many as you can *on your own* for the first few days that it is assigned. During this period, you should not be discussing solutions with others. Once you have completed all that you can, you may discuss the problems with one or more classmates to get further help.
- *HOOT:* Meet in person with Nihal Kodavarti, who is our HOOT (dedicated tutor). His schedule will be made available at the beginning of the semester.
- *Office hours:* Attend them when you can.
- *Additional practice:* Do additional problems from the textbook for practice. The solutions to many of the odd-numbered problems will be made available through the Google Drive folder.

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[1] www.gradescope.com

[2] Helpful automobile analogy (taken from Andy Field): Think of R as being the engine that does all of the hard work. Then RStudio is the comfortable interior that we enjoy and that "sits on top" of the engine.

[3] rstudio.oberlin.edu

[4] Advantage of Option 1: Students install nothing. Disadvantage of Option 1: Each time a student wants to do something with a file that was created in RStudio, the student must log in to the server. But there may be occasional server outages or slow downs.

[5] www.lock5stat.com/StatKey

Attendance, Make-Up Policy: Students should understand the importance of attending lectures and doing the assigned work. A student who misses a lecture is responsible for any announcements made during that time. Moreover, *late homework is not accepted.* A legitimate absence due to a recognized Oberlin-related activity, a religious holiday, a verifiable illness, or an emergency will be reviewed on an individual basis. Concerning the exams, if a student must miss one, then they must obtain permission from the instructor in advance. With that said, *students who are sick should notify the instructor and stay home.*

Accommodations: Oberlin College is committed to providing equitable access to learning opportunities for all students. If you have a disability and are seeking accommodations, please contact the Disability Resources at the Center for Student Success. All requests for accommodations must go through that office. You should also contact the instructor *at least* two weeks before the accommodations are needed.

Scholastic Dishonesty: Forms of scholastic dishonesty that violate the Honor Code include: searching for homework solutions online; cheating on exams; taking or using past/present exam materials without instructor permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain grades dishonestly. In particular, *do NOT search for homework solutions online.* Doing so creates a destructive habit; it also violates the Honor Code.

Collaboration during the write-up stage of a homework assignment, or handing in an assignment that is practically identical to a fellow classmate's work, is cheating and may result in a grade of zero for the assignment. More specifically, when collaborating with classmates, students are not permitted to share their fully worked-out solutions to the homework problems.

All students are expected to follow the Honor Code. If it is determined that a student has cheated on a course grade item, then the student will receive an automatic grade of zero for that item. Moreover, depending on the severity of the cheating, the student may be given a grade of F for the course and may face additional sanctions from Oberlin College.