Math 214: Statistics, Spring 2022

Professor: Tobias Johnson (tobias.johnson@csi.cuny.edu)
Office: 1S-225


Course Website: http://www.math.csi.cuny.edu/~tobiasljohnson/214/
This will be where announcements and a schedule for the class appears. We’ll also use Blackboard for submitting assignments and getting grades.

Office Hours: Mondays 10:30am-12pm and Wednesdays 2:15pm-3:45pm in my office, 1S-225. If you can’t attend at either of these times and want to meet with me, send me an email and we can find another time.

Class overview: We will learn about descriptive and inferential statistics. Descriptive statistics entails summarizing large sets of data, both by numbers like the mean and the standard deviation and by different sorts of graphics. Inferential statistics consists of trying to draw conclusions about a large body of data when only a small sample of it is available. Goals for the class are to understand these concepts and to be able to apply them in practice using the statistical programming language R.

Covid precautions: We should all remember that other members of the class might be immuno-compromised or might live with people who are unvaccinated, immuno-compromised, or elderly. So regardless of our personal levels of concern about covid, we must all follow the relevant campus guidelines out of respect for each other. For now, this means wearing a mask, staying home if you feel sick, and following guidelines for quarantining if you’re exposed to covid and for isolation if you contract it. These guidelines might change as the semester proceeds, of course.

Homework: The homework for this class is done using the online system WebWork. It will be due once a week, usually on Friday nights. You’re encouraged to discuss problems together. If you’re stuck or confused, email me or come and talk to me in office hours. I’m always glad to help.

You may submit Webwork problems up to a week after the due date, but you’ll only receive 50% credit for answers submitted in this time.

Quizzes, Midterm, and Final: We will have one midterm, to be held in class on March 21. We will have several quizzes; I’m planning on holding four of them and have put them on the website calendar, but their number and dates are not set in stone. I will let you know at least a week in advance before a quiz. And we’ll have a final. It’s not scheduled yet, but it will probably be at our usual class time on either May 18 or May 23.

For the quizzes, as they approach I’ll tell you the topic and try to give some practice material or at least an indication of how to study for them. For the midterm and final, I have lots of old exams that I’ll provide for practice.

Quizzes, midterms, and finals will be closed notes, except that for the midterm and finals you may make and bring a single sheet of notes (I’ll specify its exact parameters before the exams). You’ll need a calculator for some or all of the tests, but any cheap scientific calculator will do.
Labs: On most Wednesdays (see the calendar), half of the class will be dedicated to a lab, where you’ll learn to use the statistical programming language R. You’ll then submit your solutions to the lab by the end of the next day. I expect that you’ll do most or all of the lab during class, though. This isn’t a full-fledged programming class, but by the end of class you should be comfortable with using R to carry out basic statistical calculations. We’ll use RStudio in the computer lab, and we’ll also have a web-based version of RStudio available to you for finishing up your labs at home (or if class needs to move online for any reason).

Extra-credit project: You’ll have the opportunity to get extra credit for carrying out a project, worth up to 20% of your grade (i.e., if you got a 0 on every quiz but full credit on the extra-credit project, it would be the same as getting full credit for the quizzes—see the table below). The project would consist of analyzing some real-world dataset using the techniques we’ll learn about in our labs and writing up your results. I’ll provide more details sometime in the second half of the class. Oftentimes extra credit is there in a class to give students the opportunity to atone for poor performance in some other part of the class, but that’s not really what I have in mind here. I’d expect (though we’ll see, of course) that most extra credit will go to students who are already doing well in the class and are simply interested in working on something interesting. In particular, the standard to get any extra credit will be high, and the standard to get the full extra credit will be extremely high. This project is truly extra credit—it is absolutely not required and I don’t expect people to do it unless they really want to.

Grading: Here is how I will weight each graded component of the class:

<table>
<thead>
<tr>
<th>Category</th>
<th>Date</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>See website</td>
<td>10%</td>
</tr>
<tr>
<td>Labs</td>
<td>See website</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>tba</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm</td>
<td>3/21</td>
<td>25%</td>
</tr>
<tr>
<td>Final</td>
<td>tba</td>
<td>35%</td>
</tr>
<tr>
<td>Extra-credit project</td>
<td>tba</td>
<td>up to 20%</td>
</tr>
</tbody>
</table>

I like to be transparent about my grading, so let me tell you in more detail how I will assign grades for the class. On the midterm and final, you’ll get some score on your exam. I’ll think about what score on the exam merits what grade, and then I’ll convert your exam score to a 0–100% scale. I’ll tell you what the conversion is after I grade the exams, by telling you the range of scores on the exam that correspond to an A, B, and C. For example, if the exam is out 57 points, and I tell you that 43–57 corresponds to an A and 33–42 corresponds to a B, this means that I’ll convert your score to the 0–100% scale by mapping 43 to 90% and 33 to 80% and linearly interpolating for scores between these values. I’ll leave the procedure a bit sketchy, since in this example I might map 57 to something above 100% if it seems merited.

For the homework, labs, and quizzes, I’ll total up your points in each category, and then I’ll convert to a 0–100% scale. I won’t tell you in advance how this conversion will work since I do it in a more ad hoc sort of way, but I’m typically more generous with these than with the exams. In particular, to get 100% in the homework and labs categories, you will not need to get very single point in the category. I do this on purpose, because I realize events might force you to miss a lab or homework assignment.
At the end of the class, to assign your grade, I take your 0–100% grades in each category and average them using the weights given in the table above. Then, I turn them into letter grades. I use the standard cutoffs, for example turning 90% into an A-, but with some flexibility, since if one student gets 89.9% and another gets 90.1%, it’s not like I’m going to give one of them a B+ and one an A-.

I do understand that sometimes it can take a while before the course material starts falling together, and if you show strong improvement from the beginning to the end of the class, at my discretion I’ll raise your grade by one step (e.g., from B+ to A-). This is only for students who show a major improvement from the beginning to the end of the class, and I should mention that I rarely use it (but I’m always happy when I get to!).

**Excused Absences:** If you are forced to miss an exam due to an unavoidable, compelling, and well-documented circumstance, contact me immediately and we will discuss the situation. For missing an exam, the most likely solution is that your remaining exams will be weighted more heavily to make up for it. Please try to make arrangements at least a week in advance, if possible. Of course, if you have a medical or family emergency, just write to me as soon as you can. If you have to miss the lab, you can still do the lab yourself at home and submit it when it’s due.

**Disabilities:** If you have a documented disability and wish to discuss academic accommodations, please contact me as soon as you can manage.

**The Unexpected:** Unexpected things happen to everyone, and right now the rate of unexpected occurrences is especially high. I’ll try to be as flexible as I can. Don’t hesitate to talk to me if your circumstances are making it hard for you or if the course policies treat your situation unfairly.