Introduction to Statistics for the Life Sciences

Spring 2015
[Statistics is] the most important science in the whole world: for upon it depends the practical application of every other science and of every art: the one science essential to all political and social administration, all education, all organization based on experience, for it only gives results of our experience.

Florence Nightingale
Statistics is the study of the collection, organization, analysis, interpretation and presentation of data.

The Oxford Dictionary of Statistical Terms, 2006
Figures often beguile me particularly when I have the arranging of them myself; in which case the remark attributed to Disraeli would often apply with justice and force: 'There are three kinds of lies: lies, damned lies, and statistics.'

Mark Twain
Course Objectives

Statistics 371: Introductory Applied Statistics for the Life Sciences

1. Develop mastery of basic statistical concepts
2. Develop the ability to apply these concepts correctly, especially in problems originating in the life sciences
3. Learn to communicate effectively in writing the results of a statistical analysis to a non-statistical audience
Course Objectives

Statistics 371: Introductory Applied Statistics for the Life Sciences

1. Develop mastery of basic statistical concepts
2. Develop the ability to apply these concepts correctly, especially in problems originating in the life sciences
3. Learn to communicate effectively in writing the results of a statistical analysis to a non-statistical audience
4. Become a more statistically-informed citizen
Course Objectives - In Other Words

- Learn how to think statistically.
Discussion Sections

▶ Each one of you is signed up for one discussion section.
▶ Attend the section you signed up for. (To change need TA permission)
▶ This week: introduction, survey.
▶ Moving forward: homework and example exercises, clarification.
Web

- Learn@UW: Used for grades. (learnuw.wisc.edu)
- Webpage: Used for lectures, syllabus, etc. (www.stat.wisc.edu/~jcdavis/371)
- Make sure that you read the syllabus: you are responsible for understanding the course policies.
The textbook is *Statistics for the Life Sciences* (Fourth Edition) by Samuels, Witmer, and Schaffner.
A scientific calculator (with logarithms, exponents, trigonometric functions, simple memory and recall, and factorial) will be necessary.

Need it for exams (HW you can use a computer or a calculator).

Hint: Become familiar with it before the exam.
Process

- Reading, slides, and HW assignments (and keys) are posted on my webpage.
- You are responsible for the reading and the contents of the lecture and discussion.
- Typically slides are not posted until after the corresponding lecture.
Homework

- Weekly homework assignments.
- Assignments are given on Thursdays or Fridays (first one will be posted by the end of this week).
- Due on Fridays in your TA’s mailbox by 4:00pm.
- No late HW (of course you can turn it in early, either to your TA’s mailbox or during discussion).
- Make sure to include your discussion section number and name. Fasten the pages together securely.
- HW is given (almost) every week (exception for midterms, breaks).
- You may collaborate on homework, but each student must write out their own solution.
- Neatness, clarity, and demonstration of intermediate steps are just as important as arriving at the correct final answer.
The real question: is doing HW and understanding the HW problems enough to get an AB?
Is Doing Homework Enough?

- The real question: is doing HW and understanding the HW problems enough to get an AB?
- No (not for most students).
- Expectation is every week you spend six hours studying the course material (reading, lecture slides, lecture notes) in addition to doing the HW.
- Global learning – exams do test route memorization, but ultimately they will test deeper understanding.
- “I did well on the homework” $\neq$ “I will do well on the midterm”
Exams

- Midterm 1
- Midterm 2
- Cumulative Final
- No makeups without documented excuse provided in advance
- One letter sheet (both sides) for midterms, two for final
Grading

- Homework assignments (15%)
- Midterm 1 (25%)
- Midterm 2 (25%)
- Cumulative final (35%)
Grading

<table>
<thead>
<tr>
<th>Grade</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≈ 30 %</td>
</tr>
<tr>
<td>AB</td>
<td>≈ 17 %</td>
</tr>
<tr>
<td>B</td>
<td>≈ 23 %</td>
</tr>
<tr>
<td>BC</td>
<td>≈ 12 %</td>
</tr>
<tr>
<td>C</td>
<td>≈ 13 %</td>
</tr>
<tr>
<td>D/F</td>
<td>≈ 5 %</td>
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</tbody>
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▶ Course grades will approximately be based on the above percentages.
▶ The course is rank-based, with exceptions in the favor of the student.
Honors Credit

- If you are taking this course for honors, talk to me in person.
Classroom Etiquette

1. Have a question? Ask.
2. Don’t carry on a conversation with your neighbor in lecture.
3. Contract: Walk in class, commit to minimal disruption to your neighbors.
4. Texting is okay. (silent mode)
5. Laptops are okay.
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Course Registration

1. No promises, but *most* students are able to officially enroll.
2. If you are not registered and want to be, wait for a slot to open in the student center.
3. Don’t email me about this.
Electronic Communication

- If you email me, have “STAT 371” in the subject line. I won’t reply otherwise.
  1. About HW? Stat 371: HW
  2. About the midterm? Stat 371: Midterm
- Send to jcdavis5@wisc.edu
- Sometimes I won’t reply directly to you. Instead I might:
  1. Address the issue in the next class.
  2. Send a response via the classlist serv.
- Business hours
Electronic Communication

- **Privacy**
- Email is not good for detailed HW questions. I won’t answer such questions over email. This is better answered in person or by your TA.
  1. Discussion section. Designed for helping you solve HWs
  2. TAs’ office hours.
  3. Professor’s office hours.
  4. Catch me or a TA after class.

- **Rule of Thumb**: If I have to write more than 5 sentences to answer your question, email is unlikely the best mode of communication. Also, **I won’t respond**.

- Wall of text

- **Long-form communication**: Office Hours
Exam Schedule

1. Enrolling for this course signifies **at least** the capacity to attend the listed exam dates (exempting, of course, university-approved excuses).

2. Weddings, vacations, business trips, being tied up with other courses, being generally busy, etc. – these are not valid reasons to miss a test, and I won’t respond.
Concerns So Far

1. Will you post notes ahead of time?
2. How to take notes? Will you always use slides?
3. When is the first homework assignment due?
Other Questions

- Do you have concerns?