

Stat 371: Introductory Applied Statistics for the Life Sciences

Professor: Bret Larget
Office: 4390 CSSC (Computer Science and Statistics Center)
Phone: 262-7979
E-Mail: larget@stat.wisc.edu
Web: <http://www.stat.wisc.edu/~larget/>
Office Hours: Monday 1:00 – 2:00 P.M.,
Wednesday 2:00 – 3:00 P.M.,
Friday 9:00 – 10:00 A.M.,
and by appointment
Class Hours: MWF 11:00 – 11:50 A.M.
Room: 1240 CSSC (Computer Science and Statistics Center)
Textbook: *Statistics for the Life Sciences*, Second Edition, by Samuels and Witmer

Prerequisites:

Students should have demonstrated mathematical knowledge of algebra and trigonometry (with Math 112 and 113 or Math 114), although the algebra content of the course is small and the trigonometry content of the course is nil. One semester of Calculus suffices as an alternative mathematics prerequisite. Freshmen may enroll in the course. Be aware that credit cannot be given for this course if you have already completed Stat 201, 224, 301, or 324.

Students will need a scientific calculator with statistical functions. (Programmable calculators are very good if you have one, but nearly any scientific calculator, including some that sell for around \$20 will do.) Some homework assignments require the statistical package R, which may be freely downloaded onto your Windows PC, Macintosh, or Linux machine. The software's homepage is <http://cran.r-project.org/>, but the U.S. mirror, <http://cran.us.r-project.org/>, will be faster. R is also available on Statistics Department computers.

Course Objectives:

The primary course objectives are for the students enrolled in the course: (1) to develop mastery of basic statistical concepts; (2) to develop the ability to apply these concepts correctly, especially in problems originating in the life sciences; and (3) to learn to communicate effectively in writing the results of a statistical analysis to a non-statistical audience. Students in the course will also gain some proficiency in using the computer to carry out statistical analysis using the statistical package R.

Grading:

Grades are primarily based on a large number of short exams designed to test mastery of statistical concepts and their application and the ability to communicate the results. Weekly homework and an optional project can also affect your course grade. Grades are assigned according to this scale:

Mastery Points	Grade
9+	A
8	AB
7	B
6	BC
4-5	C
2-3	D
< 2	F

Each student may earn up to eight mastery points through mastery exams, up to two points through homework, and up to one point for completing an optional course project.

Mastery Exams:

There are nine opportunities to take a 30 minute mastery exam during the regular semester. Students may attempt as many additional mastery exams as they choose during the final exam period. To pass a mastery exam, a student must demonstrate mastery of the tested statistical concept by essentially solving an extended problem completely correctly, other than very minor calculation or conceptual errors. There will be four levels of exams in increasing difficulty. Level one exams are the easiest and test only basic understanding. Level four exams are the most challenging. To pass a level four exam, the student must read and understand a problem written in a scientific context, select an appropriate method of analysis, carry out the analysis (or interpret output from a statistics package), communicate the results clearly, and discuss in

writing the assumptions inherent in the method, the validity and potential weaknesses of the analysis, and the implications in the context of the scientific problem. Level two and three exams are intermediate.

Students begin with level one exams and move up to more difficult levels after passing two exams of the previous level. (As the semester progresses, not everyone will be taking exams at the same level at the same time.) It is possible for a student to pass the maximum eight mastery exams prior to the final exam period and be excused from the final. However, a student cannot earn an A grade through exams alone.

There are no make up dates for the mastery exams. If you need to attend a family function, leave early for break, stay home ill, or decide to miss an examination for any reason, you are in effect deciding to have your grade based on fewer opportunities to exhibit mastery of the subject. Make an adult decision that is most appropriate for you and accept the consequences.

Homework:

There will be weekly homework assignments, consisting of exercises from the textbook, exercises from other sources, and problems to solve by computer. Doing homework is the best way to learn statistics and the best way to prepare for the mastery exams. Each homework problem is worth up to two points. A '2' indicates that the student made a serious attempt at solving the problem, getting a substantial part of the problem correct. (Note that a '2' does not necessarily mean that the problem was solved correctly ... similar work on a mastery exam might not pass.) A '1' indicates that the student attempted the problem but is quite far from an acceptable solution. A '0' indicates the student did not attempt the problem or did little more than restate the problem.

Students who get 90% or more of the possible homework points earn two mastery points. Earning 70% or more of the possible homework points results in one mastery point. Homework will generally be due on Fridays. Late homework will not be graded.

Your homework solutions should be **written up with a Word processor**, although you can hand write in graphs, sketches, figures, and mathematical notation. Each problem solution should include a brief description of the problem (that may be paraphrased from the actual problem) as well as the solution. Take care to see that your written homework solutions are clear and easy to read.

Optional Project:

Students may opt to work alone or in groups of two or three students on an optional project. A successful project is worth one mastery point. Students must commit to doing a project within the first three weeks of class. Projects should not be seen as extra credit, but rather as an opportunity to work hard to obtain something extra from the course. A project will include finding a biological question of interest, designing an experiment, producing data, analyzing the statistically, and writing a report. Students who choose to do a project should do so under the expectation that the work involved will be substantial. Projects enrich rather than replace learning in the regular course curriculum.

If you are working in a lab on campus, you may be able to design a project appropriate for this course that involves your research in that lab. I can also provide additional ideas for projects. We will discuss this in more detail a few weeks into the semester.

Final Exam:

During the final exam period, students may take additional mastery examinations.

Course Web Page:

The course Web page will include an anticipated schedule including mastery exam dates, homework assignments, supplementary notes, help for the statistical package, and other information useful for the course. You will be able to access the course web page from my home page, <http://www.stat.wisc.edu/~larget/>.

Academic Honesty:

You are permitted and, in fact, *encouraged* to talk to other students, your teaching assistant, or me about homework. Your TA or I may give you clues or discuss similar problems without doing your homework for you. You may look through books or Web pages for solutions to problems. However, you may not present other people's work as your own. Make sure to include with any submitted solutions to problems references to any sources of direct assistance. If you work with other students solving problems, make sure that you write up your own solution independently. It is not acceptable for one student to write a solution for another student to copy.

You must work independently during mastery exams. You may not share calculators or pass notes during the exams.