

**Stat 205: Elementary Statistics for the Biological and Life Sciences**  
**Spring 2014**

Tuesday/Thursday 8:30 a.m.–9:45 p.m. in Petigru College 108

- **Instructor:** Dr. Tim Hanson  
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Website: [http://www.stat.sc.edu/~hansomt/stat205/stat205\\_spring2014.html](http://www.stat.sc.edu/~hansomt/stat205/stat205_spring2014.html)  
Office hours: Tuesday & Thursday 10–11am, and by appointment
  
- **Description:** 3 credits; prerequisite is Math 111 or higher. This course gives students in biology, ecology, public health, pharmacy, nursing and other life sciences a non-calculus based introduction to the application of modern statistical methods including descriptive and inferential statistics. Statistics is a *foundational research tool* within the biological and life sciences. Topics include descriptive statistics, probability, and inference for statistical models including: one and two sample problems for continuous and discrete data,  $2 \times 2$  tables (independence; comparing odds ratios, relative risks, and differences in proportions; diagnostic testing), one-way ANOVA, linear and logistic regression, and survival analysis.
  
- **Learning objectives:** After completion of the course, the successful student will be able to (a) understand and interpret common graphical displays and summary statistics from data, (b) apply the rules of probability to solve basic problems, (c) understand aspects of one and two sample problems, including confidence intervals, hypothesis testing, sample size calculation, power, and checking assumptions, (d) understand basic ideas underlying one-way analysis of variance, (e) understand aspects of the simple linear regression model: least squares estimation, the normal-errors model, confidence interval and hypothesis tests for slope  $\beta_1$ , (f) understand the logistic regression model and its use for analyzing Bernoulli outcomes with a continuous predictor, (g) understand aspects of  $2 \times 2$  contingency tables: relative risk, odds ratio, difference in proportions, case-control studies, independence, sensitivity, specificity, and prevalence, predictive values positive and negative, Simpson's paradox and the Cochran-Mantel-Haenszel test, (h) have a basic understanding of related ideas including receiver operator characteristic (ROC) curves, disease rates, incidence versus prevalence, and survival curves, and (i) be able to carry out common statistical methods in the computing package R.

- **Required textbook:** *Statistics for the Life Sciences*, 4th Ed., by Samuels, M.L., Witmer, J.A., and Schaffner, A. Addison Wesley, 2011.
- My **expectations** for you: *Read* the sections of the text to be covered prior to the class session. *Attend* class and arrive on time. Note that regular attendance is required. Do assigned homework *after every lecture*. *Ask questions* to clarify concepts.
- **Computing:** Statistical analyses will be carried out via R, free software for statistical computing and graphics. If you have your own Windows-based machine or a Macintosh, you can install R now from <http://cran.r-project.org/>. You will also need a scientific calculator for exams.
- **Homework:** Homework assignments will be posted on the course website each week, except exam weeks. *I cannot overstress how important these assignments are to learning the material.*
- **Exams:** Two in-class exams will be given, currently scheduled for Tuesday Feb. 18 and Tuesday Mar. 25. Make-up exams will be considered *only in extreme circumstances* and documentation is required. Contact me *ahead of time* if you think your situation merits a makeup. The final exam takes place Thursday, May 1 at 9:00 p.m.
- **Grading:** Each of the three exams is worth 15%, your homework is worth 45%, attendance is 10%. Grades: 90%-100% A, 85%-89% B+, 80%-84% B, 75%-79% C+, 70%-74% C, 65%-69% D+, 60%-64% D, under 60% F.