Description: Elementary Statistics for the Biological and Life Sciences. (3) (Prereq: MATH 111 or higher, or consent of department) An introduction to fundamental statistical methods with applications in the biological and life sciences. Topics include descriptive statistics, probability, inference, and an overview of contingency tables, linear regression, and ANOVA.

Purpose of the Course: To give 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. To show students that statistics is an important research tool within the biological and life sciences.


Attendance: All students are expected to attend all classes. It is assumed that any information given out during class has been delivered to all students.

What is Expected of You:
*Read* the sections of the text to be covered prior to the class session.
*Attend* class regularly.
*Arrive* on time.
*Bring* lecture notes with you.
*Attempt* to do all assigned homework.
*Ask* questions when you don’t understand!

Learning outcomes:
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, (f) understand the logistic regression model and its use for analyzing Bernoulli outcomes with a continuous predictor, (g) understand aspects of 2×2 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.
**Calculator and Computer:** Each student will need a scientific calculator and access to the internet to complete homework assignments and print off notes and readings. We will use “R” and “RStudio” – free downloads (to be demonstrated in class). Computers are located throughout the campus. **No graphing calculators allowed.**

**Computer Facilities:** Computers are available throughout campus. Also, a computer account using the MATH/STAT (MS) domain within LeConte will be set up for you. Use your **Blackboard username and your social Security Number to log in the first time** – then you can change your password to anything you want. Two MS labs are available in LeConte, rooms 124 and 303A. Check these locations for hours. Through this account you will have access to the internet while in LeConte, but **no printing.**

**Class e-mails:** Please make sure your e-mail address is current in the Blackboard system. All class e-mails will be sent through blackboard.

**Cell Phones:** Keep them out of sight and turned off. **Absolutely no cell phones during exams.**

**Honor Code:** See the Carolinian Creed in the Carolina Community: Student Handbook & Policy Guide. Possible violations of academic integrity will be referred to the Office of Academic Integrity. Please read [http://www.housing.sc.edu/academicintegrity/](http://www.housing.sc.edu/academicintegrity/) for full details of this procedure and definitions.

**Homework (40% of semester grade):** Homework covering the concepts taught in the class will be assigned regularly throughout the semester and will be posted in the “Homework” section of the class website. I would suggest trying the homework yourself before discussing with others. Attempting to do problems yourself will reveal if you really know the material. Selected homework problems will be graded. These graded homework assignments will be due **no later than the beginning** of lecture on the due date. Assignments turned in after lecture begins will not be accepted. **Note:** If you know you are going to miss lecture, turn in the assignment early (there are many ways to arrange this) or send with a trusted friend! It is your responsibility to keep on top of due dates. The homework assignment with the lowest grade will be dropped. Your course homework grade will be computed by taking the average of your remaining homework scores.

**Exams (20% of semester grade each):** Two in-class exams will be given. Dates are listed on the Schedule of Topics sheet. All work on exams must be independent. Make-up exams will be considered only in extreme circumstances and a doctor’s note/legitimate excuse will be required. Contact me as soon as possible if you think your situation merits a makeup.

**Final Exam (20% of semester grade):** The final exam for this course will be comprehensive and will be administered:
Wednesday, April 25 at 2 pm.

All work on the final exam must be independent.

**Course Grade:** Your semester grade will be computed by weighting your homework grade (40%) with exam grades (20% each) with grade cutoffs as follows:

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<th>Grade</th>
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<td>A</td>
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**Note:** *Any changes to this syllabus will be to the benefit of the student.*