Statistics for Ecologists Summer 2015

Brief Description:

      This course is intended to provide students with an introduction to probability and statistics as applied to ecological problems. This course fulfills a prerequisite for several upper-level courses in the Fisheries and Wildlife curriculum, and the material you learn in this course will provide a critical base for future courses you will take. The course format will include lectures and lab exercises. My goal is to provide you with the conceptual basis for statistical techniques, but include examples that will be relevant to you in future classes.

Course Code: STT 224

Prerequisites: MTH 103 or MTH 116 or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 152H or concurrently) or (LB 118 or concurrently)

Time: Lecture/Lab MF 9:00am - 12:00pm and 2:00 – 5:00pm Farm Center Meeting Room

Office Hours: By arrangement (I am generally available all week, just schedule a time)

Number of Credits: 3

Instructor: Thomas Luhring
               tomluhring@gmail.com

Teaching Assistant: Pat Hanly
               pjhanly@gmail.com
               Office hours by arrangement

Recommended Text: Introductory Biological Statistics, 2nd edition. Raymond E. Hampton and John E. Havel. Waveland Press, Inc. 2006.

Web access to course materials:

Copies of class Powerpoint slides can be found at the course D2L site. Laboratory assignments will generally be supplied through LON-CAPA.

Grading:

	% of Grade
Exam 1	17.5%
Exam 2	17.5%
Final Exam	30%
Laboratory Assignments	35%
TOTAL	100%

Grade	Letter	%	Grade	Letter	%
4.0	A	93-100%	**2.0**	C	73-77%
3.5	A- / B+	88-92%	**1.5**	C- / D+	68-72%
3.0	B	83-87%	**1.0**	D	63-67%
2.5	B- / C+	78-82%	**0.0**	F	< 63%

In addition to these grading criteria, I reserve the right to fail any student who achieves a 60% or less on the cumulative final exam.

Another critical note is that we will use D2L to record your grades, and to allow you to check to see if we have received materials and recorded grades accurately, BUT, do not rely on D2L to compute the final weighted average. I am more than happy to show you where you stand at any time and can show you how to calculate your average.

Attendance and assignment policies:
If you are unable to attend class on a particular day it is your responsibility to make up the work missed. **Before seeing me** about what you missed for the day, obtain a copy of the Powerpoint slides for the day and speak with another student in the class about getting any additional notes for the class. If you are still unclear about what was covered in class you should visit me or Pat to clarify any confusing issues. I will not provide you with the entire lecture; rather, I will help you work through those areas you do not understand or need additional examples.

Assignments are due on the date listed unless you have made specific arrangements with me **ahead of time**.

All students are expected to take exams on the date listed on the syllabus. Failure to attend the scheduled exam period will result in a zero for the exam. If circumstances arise where you are unable to take an exam on the specified date (e.g., conflict with scientific conference), please see me as early as possible to make other arrangements. Students arriving late for an exam will not be given extra time to complete the exam. All exams are closed book, closed note, and closed neighbor.

Academic dishonesty:
Academic honesty is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards academic dishonesty as an extremely serious manner, with serious consequences that range from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, or collaboration consult me for guidance. Cases of obvious and serious academic dishonesty are sufficient to warrant an automatic 0.0 for the assignment or even the course as a whole.

Course Outline

Part I.   **Probability**
Probability Rules
Combinations
Permutations
Binomial Distribution

Part II.   **Descriptive statistics and sampling**
Descriptive statistics
Sampling
Presenting data - tables
Presenting data - graphs

Part III.   **Inferential Statistics**
One sample t-test
Two sample t-test
Two sample paired t-test
Chi-square
Regression
Analysis of Variance

Note: topics will not be covered in above order

Tentative Lecture and Lab Schedule

Note: this is likely to change, and should only be used for rough guidance

Date	Topic/Activity	Assignment
Mon May 18	Course Introduction (AM) Probability Rules (AM) Binomial (PM) Excel Basics (PM)	HW 1 (Due Friday)
Tues May 19	Combinations (AM) Permutations (AM) Descriptive statistics (PM) Descriptive statistics (PM)	HW 2 (In-class: AM) HW 3 (In-class: PM)
Weds May 20	**Exam 1 (AM)** Sampling (AM) Sampling (PM)	HW 4 (In-class: PM) ***HW 5** (Designing Sampling Regime)
Thurs May 21	Sampling (AM) Sampling (PM)	HW 6 (In Class: AM) HW 7 (In Class: PM)
Fri May 22	Inference (AM) Inference (PM)	HW 8 (In Class: PM)
Mon May 25	NO CLASS LABOR DAY! Stay Safe.	
Fri May 29	**Exam 2 (AM)** ANOVA	***HW 9** (Analyzing Data) HW 10 (In-class: PM)
Mon June 1	Correlation (AM) Regression (AM) Presenting Data (PM)	HW 11 (In-class: PM)
Fri June 5	Chi-Square (AM)	HW 12 (In-class: PM)
Mon June 8	**FINAL EXAM (AM)**	***HW 13/14/15** (Group presentations: PM)

*Group Presentations: Groups of 3-4 will work together to design a sampling regime to compare populations of organisms that they expect to differ in some way (HW 5). The same groups will then sample their populations (HW 13) analyze the data (HW 9), and present the data and their conclusions at the end of the last class (HW 14). Each individual will also write a short 1-page reflective paper about one misconception or fuzzy area they had coming into or during the class (HW15).

Final Exam Friday June 8, 2015: 9:00 – 11:45 a.m.