ES/STT 7140: Statistical Modeling for Environmental Data
Spring, 2018
Mondays and Wednesdays from 6:10-7:30
Oelman Hall, Room 341

Instructor: Brandon Greenwell

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Course web page: https://github.com/bgreenwell/stt7140-env

Textbook: There is no required text for this course. Notes and exercises will be provided by the instructor. Most of the material will be compiled from the online notes available http://www.wright.edu/~thaddeus.tarpey/es714.html. The textbook "Environmental and Ecological Statistics in R" (3rd Edition) is recommended, but not required.

Office hours: By appointment. Typically available before and after class.

Description: This course will provide students with the statistical techniques needed for collecting, analyzing, modeling and making inference from biological data. A list of topics is shown below. The course begins with an overview of the fundamentals of sampling designs, followed by a quick review of simple linear regression. Advanced topics in regression will be covered including multiple regression, mixed effects, analysis of covariance, and nonlinear regression. This leads naturally to generalized linear models including logistic and Poisson regression and the introduction of likelihood ratio tests. Towards the end of the course, time series analysis will be introduced and, if time permits, spatial statistics will be introduced as well.

Prerequisites: BMS 9910, STT 6300/4300, or equivalent (i.e., comparing two or more populations, basic regression, etc.).

Statistical software: Software will be needed to analyze data for notes and homework assignments. Students are welcome to use any software they prefer. However, I will illustrate topics using the R software environment for statistical computing and graphics. R is very powerful and can perform state-of-the-art statistical analyses and produce professional graphics easily. R is free and available at the following link: http://cran.r-project.org/.

Homework: A homework assignment will be distributed each week based on material from the lecture. Problems on the homework will consist primarily of data analysis projects and some statistical theory. For data analysis problems, a short report should be prepared consisting of an introduction, data analysis results, and a discussion of the results. The homework will be due one week after it is assigned at the beginning of class.

Final Exam: A take home final will be given during the final week of classes.

Grades: Final grades will be determined based on homework assignments and the final exam. An overall homework average will be computed based on the percentage of points obtained from all possible points. The amount of points on individual assignments will vary depending on the length of the assignment. The final exam will count for 35% of the course grade and homework assignments will account for the other 65% of the final grade. Grades will be assigned on the usual scale (e.g., 90-100 for an A, 80-89 for a B, 70-79 for a C, etc.).