Syllabus – Advanced Biostatistics, ZOOL/PLB 558, Spring 2014

Instructor: John D. Reeve, Dept. of Zoology, Life Science II, Room 355D, (618) 453-6670, jreeve@siu.edu. Office hours TBA.

Time: Lectures are MW 4-5:15 pm, Life Science II, Room 430. There is also a discussion section on F 3-3:50 pm, Life Science II, Room 367. The discussion will be used for questions on the lecture material, sample problems, software demos, and to discuss assigned readings from the ecological literature.

Text: The course text will consist of lecture notes plus various readings from the ecological literature. We are using lecture notes because the existing textbooks do not provide enough theoretical background for graduate students, nor much information on the use of statistical software.

Lectures and Discussion: Attendance of the lectures is important because there is a substantial amount of material not found in the lecture notes, including the use of statistical software. I will provide copies of the lecture notes for the first week of the course, but after that you will need to download them through Desire2Learn (online.siu.edu). Readings from the ecological literature will also be assigned for discussion, again available online. You’ll need an SIU network ID and password to access the course material, as well as being registered for the course.

Software: (1) SAS for Windows, Version 9.2 or 9.3. SAS is a statistical software package in common use throughout education, research, government, and industry. It is available at SIUC through a site license and can be leased for either departmental or personal use for $65. You can request a copy by contacting the Site Licensing Team at license@siu.edu. Be sure to include your name and email address, the number of copies requested, and the location where the software will be installed. You will then receive instructions to download and install the software. While the software contains a help system, most of the SAS documentation can be found online in pdf form. See links on Desire2Learn.

(2) R 2.15. This is a free statistical programming language that implements many cutting-edge procedures as well as standard ones, although it is less user-friendly than commercial software. It can be downloaded at http://cran.r-project.org/. We will use it for statistical procedures involving resampling such as bootstrapping and randomization tests. As we did last semester, I will also provide R equivalents of the SAS programs used in the class.

Assignments and Grading: The overall grade will be based on 300 total points, divided among homework problems (120 total), a midterm (50 points) and final (80 points), plus an
oral presentation on a statistical problem in your own research (50 points). The midterm and a portion of the final exam are given in class and are closed book, except that you can use a 3 × 5 card of formulas (or whatever) during the exam. Grades are determined on a percentage basis (90-100% A, 80-90% B, 70-80% C, etc.). The material in the discussion readings is often included in the exams. Students are allowed to discuss the problem sets and ask me questions about them, but each student must submit their own work (no copying). This includes solutions to problems from previous years. The final exam is scheduled for Thursday, May 8, 8:00–10:00 pm.

**Topics to be Covered**

**Correlation and Principal Components**
Discussion: Sample problems, Q & A
Homework problems.

**Multiple Regression**
Discussion: Anderson et al. 2000, Guthery et al. 2001
Homework problems.

**Logistic Regression**
Discussion: Sample problems, Q & A
Homework problems.

**Resampling Methods - Jackknife, Bootstrap, and Randomization Tests**
Discussion: Dixon 2001
Homework problems.

**Midterm**

**Mantel Tests**
Discussion: Fortin and Gurevitch 2001
Homework problems.

**BACI Designs – Environmental Impact Assessment**
Discussion: Stewart-Oaten et al. 1986
Homework problems.

**MANOVA**
Discussion: Scheiner 2001
Homework problems.
Repeated Measures Analysis
Discussion: von Ende 2001
Homework problems.

Nonlinear Regression and Probit Analysis
Discussion: Sample problems, Q & A.
Homework problems.

Student Presentations

Final

Bibliography of Discussion Readings


Emergency Procedures

Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the SIUC Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on BERT’s website at www.bert.siu.edu, Department of Safety’s website www.dps.siu.edu (disaster drop down) and in Emergency Response Guideline pamphlet. Know how to respond to each type of emergency.

Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency. The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.