ABE, ANSC, NRES 445
Statistical Methods
Spring 2012   Credits: 4 hrs

Course Information
Instructor: Dr. Sandra Rodriguez Zas
Office: Room 30 Animal Sciences Laboratory (ASL)
Email: rodrgzzs@illinois.edu
Lecture-labs: Wednesdays and Fridays 10:00AM-11:30AM ACES Lib, Info and Alumni Center LIAC Room 023
Office hours: By appointment (please send email to set up a time)
Teaching Assistant: Nick Serao
Office: Room 19 Animal Sciences Laboratory (ASL)
Office hours: Tuesday 11am-12pm; Wednesday 1pm-2pm; Thursday 11am-12pm.
Email: serao1@illinois.edu
Course web address: http://compass.illinois.edu
Course name: ANSC 445
Web page login: University of Illinois NetID
Web page password: Equal to NetID for first time users or current NetID password

Description
The aims of ANSC 445 are to introduce the most common and advanced statistical approaches to describe and analyze data and provide insights into the interpretation of results. An ample set of annotated statistical analysis examples will be used and discussed. The core of ANSC 445 is hands-on practice of lecture materials using real-world biological data sets. The course materials and lab activities offer a comprehensive list of strategies to undertake a wide range of statistical analyses. At the end of the course, the students will be able to draw meaningful conclusions based on the appropriate analysis and interpretation of their own data sets.

Objectives
The objectives of the course are to:
- provide an introduction to a variety of models used across biological disciplines
- develop skills to interpret the results of the analysis and evaluate the benefits of alternative approaches
- familiarize participants with the most appropriate tools available in a widely-used statistical package (SAS®) and,
- provide an extensive set of examples and annotated code that could serve as reference for future analyses.

These objectives will be accomplished with computer lab sections, lectures, reading assignments and assessment materials.

Topics
Introduction to SAS
Descriptive statistics
Paired and unpaired two-sample analyses
Parameter estimation
Likelihood and least squares methods
Hypothesis testing
P-values
Confidence Intervals
Indicators of model adequacy
Power analysis
Classical non-parametric analyses
Bootstrap and permutation analyses
Correlation
Regression and multiple regression
One-way and n-way ANOVA
Multiple comparison adjustments
Analysis of covariance
Multiple analysis of variance
Fixed and mixed effects models
Experimental designs and models
Analysis of binary observations

Cluster analysis

Required reading materials:

Lecture notes and lab activities must be reviewed before class. Materials are available in the ANSC 445 website. During the lecture period, highlights of the lecture notes and lab activities will be presented.

Recommended reading material:

Biostatistics for Animal Science. 2009. M. Kaps and W. Lamberson. 2nd edition. CAB International.

SAS Online Documentation http://support.sas.com/documentation/ or SAS e-manual (help).

Other reading materials:

G. Derr and B. S. Everitt. 2001. A Handbook of Statistical Analyses Using SAS. CRC Press.
 G. P. Quinn and M. J. Keough. 2002. Experimental design and data analysis for biologists. Cambridge University Press.
R. P. Cody and J. K. Smith. 1997. Applied Statistics and the SAS® Programming Language. 4th Edition. Prentice Hall.
R. L. Ott. 1993. An Introduction to Statistical Methods and Data Analysis. Wadsworth Publishing.
L. D. Delwiche and S. J. Slaughter. 1999. The Little SAS Book: A Primer SAS Publishing. SAS Institute Inc., NC.
R. J. Elliot. 2000. Learning SAS in the Computer Lab. 2nd Edition. Duxbury Press.
R. C. Littell, G. A. Milliken, W. W. Stroup and R. D. Wolfinger. 1996. SAS® System for Mixed Models. SAS Publishing. SAS Institute Inc.
R. C. Littell, R. J. Freund and P. C. Spector. 1994. SAS® System for Linear Models. 4th Ed. SAS Publishing. SAS Institute Inc.

Attendance of lectures and laboratories

Class notes will be complemented with additional information provided by the instructor during the lecture and laboratory hours. Attendance to lectures is obligatory. Students that miss a class are expected to read the corresponding class materials and obtain the additional information provided in class from a student that attended the class.

Grading

Grading will be based on 5 homework assignments. Each evaluation has a value of 100 points and all the evaluations total 500 points. Attendance of lectures is required and demonstration of work on laboratory activities is a plus. A total points-to-grade scale will be based on the distribution of the total final cumulative score across all the homework assignments.

Study groups

Students will be assigned to study groups and members within a study groups are encouraged to work together towards the homework assignments. Group assignments are available in the course compass website. Each person in a study must submit a homework assignment for grading.

Grading

Evaluation type	Deadline or due day	Points
Homework assignment 1	February 10, 2012 at 10AM	100 points
Homework assignment 2	March 02, 2012 at 10AM	100 points
Homework assignment 3	March 30, 2012 at 10AM	100 points
Homework assignment 4	April 20, 2012 at 10AM	100 points
Homework assignment 5	May 09, 2012 at 10AM	100 points
Total:		500 points

Homework assignment instructions

Assignments must be submitted through the ANSC 445 compass website prior to the due day and time. The answers to the homework assignment must be included in the homework assignment file downloaded from the course website. The homework assignment file must be in MS word format and the name must include the Netid of the student and the homework identification (e.g. rodrgzzs_hwk1). Only one file will be graded per homework assignment. Submit the homework assignments at least 10 minutes prior to the deadline to avoid mishaps. Email and printed homework assignment submissions will not be accepted or graded. One late submission of a homework assignment will be graded without penalty provided the instructor has been notified at least 48 hours prior to the deadline and the submission is no later than 96 hours (4 days) after the original deadline. Additional late submissions of homework assignments will only be accepted and graded if the instructor has been notified at least 48 hours prior to the deadline and presented with a medical justification or approval by the Animal Sciences Graduate Course and Curricula coordinator. Late homework assignment submissions must be submitted no latter than 96 hours (4 days) after the original deadline.

Homework assignments will be based on the material covered in the lectures and lab activities.

Students are responsible of ensuring that their work is correctly and successfully submitted electronically and should notify the instructor of any problems with the internet connection or website at least 10 minutes before the assignment deadline.

Academic Integrity
The Code on Campus Affairs and Handbook of Policies and Regulations Applying to All Students (available at http://www.uiuc.edu/admin_manual/code/) gives complete details on the students' rights and responsibilities. Students are responsible for knowing and abiding by these rules.

Policies on computer resources and copyrights
All students must adhere to the rules and policies indicated by the software, websites and computer laboratories used for course related purposes. The policy on course notes and related printed and internet materials (e.g. published articles, website information) copyrights follows The General Rules Concerning University Organization and Procedure (University of Illinois Board of Trustees, 1998) and can be found at http://www.vpaa.uillinois.edu/policies/patents.htm and any other rule mentioned in the materials.