STAT J530, Applied Multivariate Statistics – Fall 2012

Instructor:
David Hitchcock, associate professor of statistics
209A LeConte College
Phone: 777-5346
Email: hitchcock@stat.sc.edu
Course Web Page: http://www.stat.sc.edu/~hitchcock/stat530.html
(Also accessible via Blackboard)

Classes:
Meeting Times: Tue-Thur 4:00PM- 5:15PM, BA Building, Room 203
OR via distance through Adobe Connect or online streaming video

Office Hours:
Mon. 1:00-2:00 p.m., Tues. 11:00-11:55 a.m., Wed. 1:10-2:00 p.m., Fri. 10:30-11:30 a.m.
or **please feel free** to make an appointment.

Textbook:
An R and S-PLUS Companion to Multivariate Analysis (2005), by Brian Everitt.

Prerequisite: A grade of C or higher in STAT 515 or equivalent. *For this purpose*, courses equivalent to STAT 515 include PSYC 228 or 709; EDRM 710; STAT 509, 700, or 704; MGSC 291, 391 or 692; BIOS 700. See me regarding other questions about prerequisites.

Course Outline: Chapters 1 – 8 of the Everitt textbook, and (perhaps) other miscellaneous topics. Topics covered include: summary statistics for multivariate data, multivariate data visualization, principal components analysis, exploratory factor analysis, multidimensional scaling and correspondence analysis, cluster analysis, discriminant analysis, MANOVA, multivariate regression, and canonical correlation.

Learning Outcomes:
Upon successful completion of this course, students should be able to:
- Determine which multivariate methods are appropriate for a given situation
- Understand the basic logic behind each method's construction
- Verify whether the assumptions needed to implement the methods are satisfied
- Analyze a data set using the methods in the software package of their choice
- Interpret the output for each of the methods

Class Lectures:
You may attend the lectures live on Tuesdays and Thursdays in BA 203, or you may watch them online via Adobe Connect or streaming video. Adobe Connect generally gives a clearer video picture. Information about how to access online lectures has been emailed to you. In addition, you may can look at the "Online Viewing" link on the course web page. The details for viewing the lectures either: (1) live through Adobe Connect, (2) recorded through Adobe Connect, or (3) recorded via streaming video, are listed under "Accessing Online Lectures". The call-in number for the studio and technical support contact information are also given there.

Homework:
Homework problems will be assigned periodically. Each student's homework must be done independently. You may ask each other informal questions about the homework, but everyone is to do his/her own work. If homework is found to be copied, all students involved will receive a 0. Of course, you may always ask me questions about the homework. [To be clearer, students can ask each other informal ORAL questions about homework, but **cannot look at or copy each other's homework papers**. All submitted homework must be their own work.] Note that for the take-home tests, you MAY NOT talk to each other about the problems at all.

The homework may be turned in to me personally, left in my mailbox in 216 LeConte, faxed to (803)777-4048, or sent by e-mail in a pre-approved format.

Graduate Students: The university requires that 500-level classes be more rigorous for graduate students than for undergraduates. Therefore, any students enrolling in the course for graduate credit will be asked to do some extra problem(s) on each homework assignment. Also, the grading scale for graduate students will be slightly more rigorous (see below).

Exams:
There will be one midterm take-home exam (due date to be determined, but it will definitely be in October) and a take-home final exam due Friday, December 14 by 1:00 p.m. The exams may be turned in to me personally, left in my mailbox in 216 LeConte, faxed to (803)777-4048, or sent by e-mail in a pre-approved format. **You are not allowed to receive help from *anyone except me* on the exams.** For example, you may not talk to other students about the exam problems, and you may not look at other students' exams. Violations of this policy may result in a 0 on the exam, an F for the course, and/or punishment by the USC Office of Academic Integrity.

Grading:
The course grade will be based on homework average (30%), the midterm exam (35%), and the final exam (35%). The overall course average will result in the following grades: 90-100 = A, 87-89 = B+, 80-86 = B, 77-79 = C+, 70-76 = C, 67-69 = D+, 60-66 = D, 59 and below = F.
For graduate students only: 91-100 = A, 88-90 = B+, 81-87 = B, 78-80 = C+, 71-77 = C, 68-70 = D+, 61-67 = D, 60 and below = F.

Computing:
Use of a computer is required for the analysis of multivariate data. The examples in class will be done using R and SAS (links to example code in SPSS will be given, but SPSS will not be used in the class lectures). No previous knowledge of R or SAS is assumed. The analysis for many assignments can be done using your choice of those packages, but everyone is encouraged to download a free copy of R (see the course page for downloading instructions). I expect that all necessary analyses will be able to be done in R, at least. The university has discounted rates for student versions of SAS and SPSS (for information, contact USC Computer Services).