Stat 501: Multivariate Statistical Methods  
Spring 2011

Prerequisites: Stat 500 or 402 and Stat 447 or 542 and matrix algebra.

Lecture Location: Snedecor 3121

Lecture Times: MWF 1:10 – 2pm

Class Website: http://maitra.public.iastate.edu/stat501/sp2011.html

Instructor: Professor Ranjan Maitra

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Phone: 515-294-7757

TA: currently none

Office Hours: tba


We will be following a slightly updated version of Professor Koehler's class notes which are on the class website. Please print them out and bring them to class for your convenience.

Content: Statistical methods for analyzing and displaying multivariate data: simultaneous analysis of multiple responses, multivariate analysis of variance; summarizing high dimensional data with principal components, factor analysis, canonical correlations, multidimensional scaling; grouping similar items with cluster analysis; classification methods; dynamic graphics.

Software: The software used will be R (including necessary packages) and SAS.

Grades: Your performance on two midterm exams, and one final exam will determine your grade. I will weigh midterms and finals according to the following percentages when computing the final grade:

   Midterms: each worth 25%

   Final Exam: 50%

Homework Policy: I will assign a problem set each week (roughly). However, at this point, I do not have the resources to grade the homeworks.
I will post homework problems and solutions on the course webpage. Because there is no checking mechanism, I recommend that you compare your answers with the solutions that I post and ASK me if you have questions (or have better ideas at solving the problems). I encourage you to collaborate on the homework problems, but for purposes of practice, to write your own answers independently.

**Exams:** The dates for the two in-class midterms will be decided later and in consultation with you. Some of the material may involve using and interpreting computer software/output. The registrar has tentatively set the time for the final exam to be on Wednesday, **May 4 from 2:15 - 4:15 pm**.

**Academic Dishonesty:** This class will follow the Iowa State University policy on academic dishonesty found in the ISU catalog. A score of zero will be given for the entire assignment in which the academic dishonesty occurred and further disciplinary action will be pursued in line with university policy.

**Accommodations for Students with Disabilities:** Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact Professor Ranjan Maitra, the course instructor, within the first two weeks of the semester. Retroactive requests for accommodations will not be honored. Before meeting with the course instructor, you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-6624.

**Outline:**

- Introduction and background -- Chapters 1 - 3
- The Multivariate Normal Distribution -- Chapter 4
- Inferences about Means -- hypothesis testing (Chapter 5), MANOVA/profile analysis (Chapters 6, 7)
- Analysis of variability (principal components, projection pursuit, etc) -- Chapter 8
- Analysis of correlation/association (factor & correspondence analysis, canonical correlation) -- Chapters 9, 10
- Discrimination and classification (LDA, logistic regression, classification trees, neural nets) -- Chapter 11
- Clustering -- Chapter 12
- Optional: Imputation of missing data, multi-dimensional scaling