

## Statistics 541

*Fall, 2017*

### Multivariate Statistics

Professor David W. Scott  
2057 Duncan Hall  
Ext. 6037, scottdw@rice.edu  
[www.stat.rice.edu/~scottdw/stat541/](http://www.stat.rice.edu/~scottdw/stat541/)

Tu/Th 9:25-10:40 Room AEL A121  
Office Hours: Drop in M/W/F afternoons or by appt.

TA: Robert Kosar (rk33@rice.edu) DCH 2125  
Office Hours: Wednesdays 2-4 or by appt/email

Survey of topics in classical multivariate statistics—roughly equal portions of theory, application, and computing. Additional topics as warranted. You may use the computing language of your choice. (**R** is preferred and will be used in class.) *Mathematica* will be used for symbolic calculations. We will cover the selections from the book that focus on multivariate normal theory and extensions. Some modern topics (such as Google’s page rank algorithm) will be included. Focus on geometric insights.

#### Grading:

- 30% Homework (not pledged, but submit your own paper)
- 35% Exam I (Take home, open book) October 3; Due October 6.
- 35% 2-Person group data analysis project (depending on class size, oral presentations may be split on Monday 12/4 and another date TBN; written report due by 12/13)
- 0% Exam II (optional)

Text: Alan Izenman, *Modern Multivariate Statistical Techniques: Regression, Classification, and Manifold Learning*, Springer, 2nd printing 2013 (hardcover only).

Optional Text: K.V. Mardia, J.T. Kent, and J.M. Bibby (1979). *Multivariate Analysis*, Academic Press, London (useful but awaiting new edition).

You should plan to review your theoretical linear algebra knowledge (projections, subspaces, matrix operations, bases, linear equations, determinants, eigenvectors, quadratic forms, etc) as we proceed through the course. Gilbert Strang’s book is solid. Numerical algorithms are standard these days and will not be discussed.

There are many *R* language references. A good one is *R in a Nutshell: A Desktop Quick Reference* by J. Adler (O’Reilly, ≈ \$40). You can download R executables for OSX/Linux/Windows from <http://cran.r-project.org>. Others: RStudio IDE.