

## Statistics 541

Fall, 2018

### Multivariate Statistics

Professor David W. Scott

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Canvas + <http://www.stat.rice.edu/~scotttdw/stat541/>

Tu/Th 9:25-10:40 KCK 107

Office Hours: Drop in M/W/F afternoons or by appt.

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Office Hours: By appt/email

Help Sessions 7:30-8:30: Tues DCH 1044; Thur DCH 2014

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. **JMP** will be used for graphics and **SAS**-like analyses. **Mathematica** and **JMP** are available to Rice students to download on your laptops (site licenses). We will cover the selections from the book that focus on multivariate normal theory and extensions, the core material on multivariate techniques coming from Chapters 11–20. Special focus on geometric insights.

Grading (Tentative as of 8/16/2018)

- 30% Homework (not pledged, but submit your own paper)
- 35% Exam I (Take home, open book) TBA (week of Oct 2)
- 35% 2-person group data analysis project (depending on class size, oral presentations may be split on Monday 12/3 and Tuesday 12/4; individual written reports due by 12/12)
- 0% Exam II (optional)

Text: Wolfgang Härdle and Léopold Simar, *Applied Multivariate Statistical Analysis*, Springer, Fourth Edition, 2015.

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 in depth.

There are many *R* language references. A good one is *R in a Nutshell: A Desktop Quick Reference* by J. Adler (O'Reilly,  $\approx$  \$43). You can download R executables for OSX/Linux/Windows from <http://cran.r-project.org>. Others: RStudio IDE.