

Course Announcement Fall 2012, MATH 583: Advanced Topics in Statistics:
Robust Multivariate Analysis
MWF 10-10:50 Room Neckers 0410

Text: Johnson, R.A., and Wichern, D.W. (1988), *Applied Multivariate Statistical Analysis*, 2nd ed., Prentice Hall, Englewood Cliffs, NJ. (get online for about \$10 from www.addall.com)

Course notes Olive (2012) *Robust Multivariate Analysis* will be available online or for free from the instructor.

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Office hours: MWThF TBA

I am also available by appointment and on a walkin basis, especially before and after class.

The *prerequisites* for this class are a Calculus based introduction to Probability or Statistics (eg Math 483 or Math 480) and Linear Algebra (eg Math 221). You should be familiar with vectors, matrices, eigenvalues, eigenvectors, inverse matrix, transpose, the normal and chisquare distributions, and hypothesis testing.

This course covers robust multivariate analysis. The classical multivariate method and a robust multivariate method will be given for several common techniques. Topics include i) classical and robust estimators of multivariate location and dispersion, ii) multivariate normal and elliptically contoured distributions, iii) the DD plot for outlier detection and for determining whether the data is from a multivariate normal distribution or some other elliptically contoured distribution, iv) generalized variance, v) classical and robust methods of Principal Component Analysis, vi) classical and robust methods of Canonical Correlation Analysis, vii) Discriminant Analysis, viii) classical and robust analogs of the Hotelling's T^2 test, ix) MANOVA, x) Factor Analysis, xi) Multivariate Regression, xii) Clustering if time permits.

The free statistical software *R* will be heavily used, and *SAS* will be used, and we will meet in the Math computer lab Neckers 258 several times.

Final: Thursday, Dec. 15, 12:50–2:50.

The grading and schedule below are tentative. Last day to drop: office on Friday Oct. 12, by internet Sunday Oct. 14.

Except for the last week of classes, 2 homeworks may be turned in one class period late (ie on Monday) with no penalty. A third late will be accepted with 25% penalty. One or more sheets of notes will be allowed on quizzes and exams. A calculator is permitted.

Grading:

HW	300		Quizzes	100	
exam1	100	exam 2	100	exam 3	100
final	300	or project		total	1000
min. grade	points	min. grade	points	min. grade	points
A	900-1000	B	800-899	C	700-799
D	550-699				

Week of	MON	WED	FRI
Aug 20	Intro, 1.3	2.5,2.6	2.5, 2.6
Aug 27	4.2	4.3, Q1	4.4, 4.5, HW1
Sept 3	no class	4.6, Q2	4.7, HW2
Sept 10	lab	3.2, 3.3, Q3	3.3,, HW3
Sept 17	3.4, 3.5	Exam 1	8.2
Sept 24	8.3	8.4, 8.5, Q4	10.2, HW4
Oct 1	lab	10.3, Q5	10.4, HW5
Oct 8	10.6	Exam 2	11.2
Oct 15	11.3	11.4, Q6	11.5, 11.6, HW6
Oct 22	lab	11.6, Q7	11.7, HW7
Oct 29	11.8	5.2, Q8	5.3, HW8
Nov 5	5.5	6.3, Q9, HW9	6.4
Nov 12	lab	6.7, Q10	9.2, 9.3, HW10
Nov 19	9.4, 9.5	no class	no class
Nov 26	lab	7.2, Q11	7.3, HW11
Dec 3	7.3,7.4	Exam 3	12.3