Advanced Multivariate Statistical Methods

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This course will focus on multivariate concepts, methods and analyses that students may need to use in their own research or encounter in reading research articles. The course will cover both descriptive and inferential multivariate procedures with the objectives of having students (1) gain an understanding of the various procedures, their limitations and their appropriate applications; and (2) learn to use statistical software packages to analyze data and interpret the results properly.

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Prerequisites: Regression Analysis, Analysis of Variance, Matrix Algebra

Textbooks:

Primary text for the course:

Johnson, R.A., & Wichern, D.W. (1998). Applied multivariate statistical analysis, Fourth edition. Upper Saddle River, NJ: Prentice Hall.

This text contains both theory and application with an emphasis on the geometry of multivariate methods.

Additional text for the course:

Tabachnick, B. G., & Fidell, L. S. (2001). Using multivariate statistics, Fourth edition. Boston, MA: Allyn & Bacon.

This text is very applied, with little emphasis on theory. Purchase this text if you are interested in the "how to" more so than the "why".

Optional: SAS programming book

Cody, R. P., & Smith, J. K. (1997). Statistics and the SAS Programming Language, Fourth edition. Upper Saddle River, NJ: Prentice Hall.

This text is a good option if you want a resource on general SAS programming.

Assignments:

There will be 6-8 homework assignments that will require the use of statistical software.

Computing:
Students will be required to use some statistical software packages (such as SPSS and SAS). The emphasis will be on SAS and SPSS as the primary packages demonstrated and supported.

Tentative Schedule:

Class	Date	Topic	J & W	T & F
		Introduction and general concepts		
1	June 25	Overview and matrix algebra review	1-85	1-30
2	June 26	Geometrical concepts	116-153	
		Descriptive methods for multivariate data		
3 & 4	June 27 & June 28	Principal components	458-503	609-612
5	July 1	Clustering	726-760	
		Multivariate means and Linear models		
6	July 2	Distribution theory	157-214	
7 & 8	July 3 & July 5	Inferences about multivariate means	224-279	
9 & 10	July 8 & July 9	Inferences about several multivariate group means (MANOVA)	290-358	322-390
11 & 12	July 10 & July 11	Discrimination and Classification (Discriminant analysis)	629-703	456-516
13 & 14	July 12 & July 15	Multivariate regression	377-445	
		Analyses of Association		
15 & 16	July 16 & July 17	Canonical correlation	587-618	177-218
17 & 18	July 18 & July 19	Factor Analysis	514-575	582-652