The George Washington University

Department of Statistics
Applied Multivariate Analysis
Stat 215 (Fall 2010)

Instructor: Reza Modarres
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Office hours: Tuesday 4:30-5:30 or by appointment
Class time: Tuesday 6:10-8:40, 2020 K Street, Room 8

Course Description:

This is primarily a lecture course designed to introduce you to the statistical analysis of several variables, most likely dependent, following a joint normal distribution. Stat 215 reworks much of the material in Stat 157—158 using matrices and vectors (topics 1-5). Stat 216 covers topics 5-11. Additional topics from the literature will also be covered. The computational aspects will include the use of SAS/IML.

- Matrix Algebra and Random Vectors
- Multivariate Sample Geometry
- The Multivariate Normal Distribution
- Inferences about a Mean Vector
- Comparisons of Several Population Means
- Multivariate Linear Regression Models
- Principal Components
- Factor Analysis and Inference for Structured Covariance Matrices
- Canonical Correlation
- Discrimination and Classification
- Clustering and Distance Methods

LEARNING OUTCOMES:

As a result of completing this course, you will be able to:

1. Derive properties of the multivariate normal distribution.
2. Analyze observations obtained from a multivariate normal distribution.
3. Make inferences about the mean vector.
4. Read, analyze and synthesize further methodology not covered in class.

Text: Required: Applied Multivariate Analysis, 6th Ed.,
SAS IML: Check Blackboard
In this course you will take notes, work many homework problems, take a midterm and a final. Make-up exams will not be given unless there is a medical emergency. Your grade will be based on:

**Grade:**
- Homework  50%
- Midterm       25%
- Final             25%

**Homework:** There will be 8-10 homework sets. A homework set is assigned after each lecture and due one week later, unless otherwise noted. A random sample from each set is selected for grading. Each selected problem counts 10 points. All graded work will usually be returned and discussed one week after due date. Late submissions will not be accepted. You are expected to work individually on each problem set.

**Prerequisite:** Stat 119, 157, 158 and Math 124

SAS programming language will be used and the computational aspects will include heavy use of matrix algebra tools (Proc IML). You are expected to be familiar with the SAS software. GW labs provide access to SAS and have a site license for SAS. To obtain a copy for your PC contact the Advanced Technology Lab in the basement of Gelman library. See [http://citl.gwu.edu/pages/sas.html](http://citl.gwu.edu/pages/sas.html)

**ACADEMIC INTEGRITY**
I personally support the GW Code of Academic Integrity. It states: “Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information.” For the remainder of the code, see: [http://www.gwu.edu/~ntegrity/code.html](http://www.gwu.edu/~ntegrity/code.html)

**SUPPORT FOR STUDENTS OUTSIDE THE CLASSROOM**
Disability Support Services (DSS). Contact the Disability Support Services office at 202-994-8250 in the Marvin Center, Suite 242. For additional information please refer to: [http://gwired.gwu.edu/dss/](http://gwired.gwu.edu/dss/)

The University Counseling Center (UCC) (202-994-5300) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. See [http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices](http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices)

**SECURITY**
In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.