The George Washington University

Department of Statistics
Applied Multivariate Analysis
Stat 6215 (Spring 2015)

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Office hours: Wednesday 8:40-9:40 or by appointment
Class time: Wednesday 6:10-8:40PM, 2020 K Street, Room 12

Grader Information:
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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 6215 reworks much of the material in lower-level statistics course using matrices and vectors. Additional topics from the literature will also be covered. The computational aspects will include the use of SAS or R.

• Matrix Algebra and Random Vectors
• Multivariate Samples
• The Multivariate Normal Distribution
• Inferences about a Mean Vector
• Comparisons of Several Population Mean Vectors
• Multivariate Linear Regression Models
• Principal Components

LEARNING OUTCOMES:

As a result of completing this course, you will be able to:
1. Use SAS or R for matrix manipulations
2. Derive properties of the multivariate normal distribution.
3. Analyze observations obtained from a multivariate normal distribution.
4. Make inferences about the multivariate normal mean vectors.
5. Perform and interpret principal components analysis
6. 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. 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:** Knowledge in matrices, distributions (normal, t, F, and chi-square), linear regression analysis.

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)

Alternatively you can use R to perform the same task. The R software can be installed free of charge from [http://www.r-project.org/](http://www.r-project.org/). R has a number of convenient built-in functions for matrix manipulation.

Google is a good search engine to find SAS or R codes that are useful.

**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.