

STATISTICS 575 - MULTIVARIATE ANALYSIS

Course Information

Instructor: Professor Doug Wiens
CAB 429, ph. 492-4406
e-mail: doug.wiens@ualberta.ca

Lectures: TR 9:30 - 10:50, CAB 457
Office hours: whenever I'm in my office,
or by appointment

Required text

Applied Multivariate Statistical Analysis, R. A. Johnson and D. W. Wichern, 6th edition.
(This text has been around for a while and there are now quite inexpensive copies available from a variety of outlets - Google it.)

Prerequisite material; computing

Adequate background is mathematics, and in particular linear algebra, at the level of STAT 512, regression at the level of STAT 378 and a senior undergraduate course in statistical theory.

For the computing we will use R, which is a statistical and numerical computing package developed and supplied, free of charge, by members of the statistical research community. It, together with manuals and the data sets used in the text, can be downloaded from the course web site

<http://www.stat.ualberta.ca/~wiens/stat575/stat575.html>.

This site also contains lecture notes, assignments, sample exams, R code for examples to be discussed in class, and other resources.

Look at this site soon and regularly.

Assessment

Assignments: 40%
Mid term exam: 20% (Exams are closed book, no notes)
Final exam: 40% (Three hours)
(Deferred final exams Saturday, May 5, 9:00 - 12:00; CAB 357)

Implementing the grading system

At the end of term I will have a record of each student's raw grades for all assignments, projects and exams. I will then compute a term results summary based on these raw grades, and rank everyone in order of merit. After deciding whether the class as a whole is average, above average or below average, I shall determine what percentage of the class should fall into each of the possible grades, and assign the grades accordingly. These grades will reflect my judgements, which will be based on my assessments of both absolute achievement and relative performance in the class.

There is no pre-determined algorithm for converting raw scores to grades. However, **active participation in classroom discussions, including asking and answering questions, is expected of all students. The extent to which this has been achieved will be considered when scores are converted to grades.**

There is another benefit to class participation, beyond its intrinsic value. I am regularly asked to write letters on behalf of students who are applying for awards, or for admission to further study. If I have had no interaction with you, I can report only your grade, and that beyond that I know nothing about you. Such a letter will surely not be very helpful.

General comments

This is a graduate course in which mathematical techniques and statistical applications are blended at a relatively high level. Some possibly helpful tips:

- Rewrite your notes - the on-line lecture notes omit many important details - as soon as possible after each lecture. Writing up material in one's own words is the best way to see if the material has been understood.
- If you find that you don't understand what has gone on in class, *see me right away*. Don't start drifting from one lecture to another, understanding less each time.
- On assignments: Don't hand in your rough work! Do the assignment and then rewrite it at least once - neatly, with an adequate amount of clear explanation. The rewriting stage is the most important one for finding errors in one's work, and for deepening one's understanding of it. A description of a calculation can be more informative to a reader than the calculation itself. Note:

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at www.ualberta.ca/secretariat/appeals.htm) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

Students who require accommodations in this course due to a disability affecting mobility, vision, hearing, learning, or mental or physical health are advised to discuss their needs with Specialized Support and Disability Services, 2-800 Students' Union Building, 492-3381 (phone) or 492-7269 (TTY).

Policy about course outlines can be found in Section 23.4(2) of the University Calendar.

Tentative Winter 2012 course outline; important dates

#	DATE	READING	COMMENTS
1	T Jan 10	ch. 1,2,3;	Introduction; \bar{x} and S
		Part I of 512 notes	
2	R Jan 12	3, 4	Convergence concepts; multivariate normality
3	T Jan 17	3, 4	Marginal and conditional distributions; MLEs
4	R Jan 19	3, 4	Distributions of the MLEs; discuss asst. 1?
5	T Jan 24	5	Inferences on one mean vector I
6	R Jan 26	5	Inferences on one mean vector II
7	T Jan 31	6	Paired comparisons; repeated measures
8	R Feb 2	6	Comparing two means; profile analysis Assignment 1 due
9	T Feb 7	6	Several means: MANOVA
10	R Feb 9	6	Two-way MANOVA; growth curves
11	T Feb 14	ch. 7; 378	Multivariate regression: estimates & distributions
		notes, or 578 Part I notes	
12	R Feb 16	7	Multivariate regression: inferences
Feb 20 - 24		Reading week	
13	T Feb 28	7	Regression - general concepts Assignment 2 due
R Mar 1		Midterm Exam	
14	T Mar 6	8	Principal components
15	R Mar 8	8	Principal components Discuss assignments and exam
16	T Mar 13	9	Factor analysis
17	R Mar 15	9	Factor analysis
18	T Mar 20	10	Canonical correlations I
19	R Mar 22	10	Canonical correlations II
20	T Mar 27	11	Discrimination & classification: strategies
21	R Mar 29	11	Discrimination & classification: assessment Assignment 3 due Course evaluations
22	T Apr 3	11	Discrimination & classification: Fisher's methods
23	R Apr 5	12	Clustering: measures and methods
Apr 6 - 9		Easter weekend	
24	T Apr 10	12	Clustering via likelihood; Multidimensional scaling
25	R Apr 12	12	Correspondence analysis Last class
	M Apr 16		Assignment 4 due; my office before noon
F Apr 20 9:00 - 12:00		Final Exam	

PLEASE FILL OUT THIS PAGE AND RETURN IT TO ME

NAME:

DEGREE PROGRAM:

AREA OF SPECIALIZATION:

Please list the STAT and MATH courses you have previously taken. Include the names or topics of the courses, if they were not taken here.

Please list the STAT and MATH courses you are taking this year.

Why are you taking this course?