

STAT 460:  
APPLIED MULTIVARIATE ANALYSIS  
Spring 2019

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<b>Instructor:</b>	Dr. Aaron Nielsen	<b>Email:</b>	aaron.nielsen@colostate.edu
<b>Sections:</b>	001	<b>Time:</b>	TR 3:30 – 4:45pm
<b>Location:</b>	Engr B101	<b>Webpage:</b>	<a href="http://canvas.colostate.edu/">http://canvas.colostate.edu/</a>

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**Course credits:** 3

**Recommended Textbook:** *Applied Multivariate Statistical Analysis* (any edition) by Johnson and Wichern

**Required Software:** R (It's free and available at <http://www.r-project.org/>)

**Office Hours:** These are held in the Statistics Success Center (Weber 223A).

**Prerequisite:** Stat 341

**Catalog Description:** Principles for multivariate estimation and testing; multivariate analysis of variance, discriminant analysis; principal components, factor analysis

**Course overview:** Review of Linear Algebra, Mean Inference, MANOVA, Principal Components Analysis, Factor Analysis, Discrimination and Classification, Clustering

**Homework:** Roughly 5-6 homework assignments will be assigned. Late homework is not accepted without prior approval.

**Exams:** There will be two 50-minute in-class exams. You are allowed to use a calculator and one double-sided notecard (3.5"x5") of formulas/notes/etc for the exams. No make-up exams are offered.

**Final Project** Groups of students will complete a final project that requires a 10 page report and 15 minute in-class presentation.

**Basis for Final Grade:** Your final grade will be based on your exam scores, homework sets, and the final project. The weightings will be as follows:

- Homework Assignments: 30% (approx. 5 – 6 HWs)
- Midterm Exam #1 (Feb 28): 20%
- Midterm Exam #2 (April 25): 20%
- Final Project (May 14 – 16): 30%

**Grading Scale:** Your course grade will be determined from the following grading scale:

A	92% – 100%	C+	78% – 80%
A-	90% – 92%	C	70% – 78%
B+	88% – 90%	D	60% – 70%
B	82% – 88%	F	0% – 60%
B-	80% – 82%		

**Course Policies:**

- **Attendance:** While I do not take attendance, attendance is highly recommended. You are responsible for all announcements and syllabus/schedule changes made in class. Please check your email and Canvas frequently for posted examples and announcements.
- **Late Work Policy:** Late homework is not accepted and make-ups are not given for missed exams without prior approval.
- **Extra Credit Policy:** Extra credit may be given in class randomly throughout the semester. You can't make up for missed extra credit.
- **Grades of “Incompletes”:** I will follow university procedures on “incompletes”, i.e., they are only given in situations where unexpected emergencies prevent students from completing the course and the remaining work can be easily finished the following semester. Incomplete work must be finished the next semester or the grade automatically turns into an F.
- **Group Work Policy:** Students are encouraged to collaborate on homework sets, as long as they acknowledge their collaborators. There is no penalty for working together. Of course, no collaboration is allowed on exams, as that is considered cheating. Please do not just copy your friend's homework, as this is considered academic dishonesty as well.
- **Cheating:** Students are expected to understand intuitively what proper ethical conduct means in the context of a college mathematics course. If you are caught cheating, you could fail the class or (at least) have your grade lowered, so don't even try it.
- **Students with Disabilities:** The university is committed to providing support for students with disabilities. If you have an accommodation plan, please see me so we can make any arrangements necessary to facilitate your learning.
- **Syllabus:** I reserve the right to make changes to the syllabus during the semester. Students will be notified of any changes via Canvas and an updated syllabus will be posted.

**Course schedule:** The following schedule of course materials covered is tentative, but the dates of the exams will not change.

<u>Week(s)</u>	<u>Topics</u>	<u>Book chapter(s)</u>
1 – 2	Syllabus, Intro, Linear Algebra review	1 – 2
3	Random Sampling and the Multivariate Normal Distribution	3 – 4
4	Mean Inference	5
5	MANOVA	6
6	Catch-up and Exam #1	
7 – 8	Principal Components Analysis	8
9	Factor Analysis	9
10 – 11	Discrimination and Classification	11
12	Clustering	12
13	Catch-up and Exam #2	
14	Work on projects	
15	Project presentations	