

# APPM 3310: Matrix Methods and Applications

## Course Syllabus Fall 2018

### Ian Grooms

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*Lecture:* ECCR 150, MWF at noon.

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*Lecture:* MUEN E113, MWF at 2 p.m.

**Webpage:** To access the course webpage, go to [www.colorado.edu/amath](http://www.colorado.edu/amath), then select 'Academics,' then select 'Courses,' then 'Fall 2018,' then scroll down to APPM 3310. Announcements, policies, office hours, etc. will be posted to the course webpage. Before emailing any of the instructors to ask a question, check the course webpage.

*Text: Matrix Analysis and Applied Linear Algebra* by Carl D. Meyer, SIAM, 2000, ISBN 978-0-898714-54-8.

*Course Goals:* To understand the basic concepts of linear algebra; the course will cover the following primary topics:

- Solving linear systems: Gaussian Elimination, LU factorizations, matrix inversion
- Notions of vector spaces and bases
- Inner products and norms
- Least squares approximations
- Orthogonality & QR factorization
- Eigenvalues and Singular Value Decomposition

**Grade determination:** Your final course grade will be a sum of points from your homework, exam, and project scores. The point distribution is as follows:

- Homeworks – 22 points
- Exam #1 – 20 points

- Exam #2 – 20 points
- Project – 20 points
- Final exam – 20 points

The total above is 102; the extra 2 points are extra credit points associated with homework, as described below. Any final cumulative score for the course above 100 will be treated as a 100. The standard grade scheme is as follows: 93–100% = A; 90–92% = A-; 87–89% = B+; 83–86% = B; 80–82% = B-; etc. The instructors reserve the right to *lower* the percentage points needed to obtain the corresponding letter grade.

**Homework:** Doing and understanding the homework is very important in this class. There will be weekly homework assignments; they will be posted to D2L. Solutions will be posted on D2L. Homeworks due on exam days will not be collected, but solutions will be posted to D2L to help you study for the exam.

There will be 11 graded homeworks. Each will be worth 2 points towards the final course grade. None will be dropped, but it is possible to get 100% in the course with only 10 homeworks; in some sense one homework can be considered extra credit.

Late homeworks will not be accepted. A hard copy of the homework must be turned in; electronic copies will not be accepted.

**Exams:** There will be two midterm exams and a final. The midterms will be October 3 and November 7 from 6:30 to 8:00 pm in HUMN 1B50. The final is comprehensive, but it will focus on material after the first two midterms. Calculators and notes (including the textbook and 'cheat sheets') are not allowed on the exams.

**Project:** Students are required to do a group project. The goals are for you to (i) use the course material to explore applications of your interest, (ii) gain experience with computational methods and software, and (iii) develop and practice written presentation skills. Groups must have 3 or 4 members. You will lose points if your group has less than 3 members, and groups of more than 4 are not allowed. The project grade will be based on a project proposal, and the written report. More details about the projects will be made available later in the semester; check the class webpage, and attend class for announcements.

**Office Hours:** Each instructor will have office hours at times and locations listed on the course webpage. Two homework review sessions will be held on Monday and Tuesday evenings, run by Learning Assistants, at times and locations listed on the course webpage. Expect

a delay of up to one business day (8 am to 5 pm, Monday through Friday) for instructors to respond to email.

*University policies:* See

<http://www.colorado.edu/amath/academics/student-resources/policies> for the relevant university and department policies.

Students formally affiliated with curricular and extracurricular University-related activities are required to communicate in writing with the instructor about potential conflicts within the first week of class or as soon as the student learns of a conflicting event. This deadline is established in order to provide students with time to change their course schedule if necessary. Instructors are not obligated to accommodate any potential conflicts, but may, at their own discretion, allow reasonable accommodations for these absences.