1 Course Information

The topics covered in Math 311 are matrices, linear equations, real vector spaces, inner product spaces and transformations. In order to take the course you must satisfy one of the following:

- you must have passed Math 243 or 253A with a C or better (or be taking them concurrently),
- or have permission from the instructor.

The course will use two textbooks as references for the course:


The lectures will be held in 404 Keller Hall, Tuesday and Thursday 1:30-2:45pm.

2 Instructor

Instructor: Dr. Achilles Beros

Email address: beros@math.hawaii.edu

Office: 306 Keller Hall

Office Hours: Tuesday and Thursday 3:00pm-4:30pm.

3 Grading

The course grade will be assigned based on 5 components.

- Homework (20%)
- Quizzes (15%)
- Midterm 1 (20%) (September 25, 2018, in class)
- Midterm 2 (20%) (October 25, 2018, in class)
- Final Exam (25%) (December 11, 2018, 12:00-2:00pm)

The exam dates and times are fixed. No makeup exams or alternate times will be possible. Genuine, documented medical/family emergencies will be considered on a case by case basis.

The following grades are guaranteed, although the cutoffs for the grades may go down:

- 85% guarantees an A- or better
• 75% guarantees an B- or better
• 60% guarantees an C- or better
• 50% guarantees an D or better

Homeworks will be due weekly on Thursday. There will be quizzes approximately once every two weeks. Quizzes will be administered at the end of lecture on Thursday. The two lowest quiz scores and the two lowest homework scores will be dropped in order to allow for minor sickness (ones for which a doctor’s note is not obtained) or necessary absences. There will be no makeup quizzes and no late homeworks.

The homeworks and quizzes will, in part, be graded on the clarity of your work. Make sure that you organize your thoughts and explain your work. For the homework, it is useful to do a rough draft and then a final draft.

4 Policies

• The use of computational or network-connected devices (e.g., calculators, smartphones, tablets, laptops etc.) is strictly forbidden during in-class exams and quizzes.
• The midterms and quizzes are all closed book and closed notes. Whether a formula sheet will be allowed for the final exam will be announced later in the semester.
• Homework will be due by the end of lecture on Thursday.
• The quizzes will be ten minutes long and will be conducted at the end of lecture on Thursday.
• Discussion of homework assignments is permitted, but solutions must be written up independently.
• Answers without explanation or work justifying the answer will receive no credit.

5 Curriculum Schedule

The following is the intended weekly schedule for the curriculum. The dates for individual topics are likely to change somewhat. The quiz dates will not change.

1. 8/21-8/23: Systems of linear equations; matrices; row echelon form (Quiz)
2. 8/28-8/30: Elementary operations (8/28 deadline for 100% tuition refund)
3. 9/4-9/6: Solving linear systems; matrix arithmetic; \( \mathbb{R}^n \) (Quiz)
4. 9/11-9/13: Inverses; similar matrices (9/11 deadline to drop without a W)
5. 9/18-9/20: Determinant; properties of the determinant; review (Quiz)
6. 9/25-9/27: Midterm 1; applications of the determinant
7. 10/2-10/4: Real vector spaces; subspaces (Quiz)
8. 10/9-10/11: Span; linear independence; basis
9. 10/16-10/18: Basis and dimension; isomorphism; rank (Quiz)
10. 10/23-10/25: Review; midterm 2
11. 10/30-11/1: Linear transformations (Quiz, 10/29 drop deadline)
12. 11/8: null space (kernel); range (11/6 holiday)
13. 11/13-11/15: Matrix representation (Quiz)
14. 11/20: Eigenvalues and eigenvectors
15. 11/27-11/29: Diagonalization; applications (Quiz)
16. 12/4-12/6: Inner product spaces; geometry; Gram-Schmidt process; orthogonal complements
17. 12/11: Final exam

6 Course Website

The homework problems, exam study guides and solutions will be posted on the course website
http://math.hawaii.edu/~beros