Math 237-103
Linear Algebra

Course information:	Math 237 – Linear Algebra Fall 2017 Course format: Web-enhanced	**Instructor:**	Dr. Drew Lewis drewlewis@southalabama.edu MSPB (ILB) 439
Meeting times:	TR 12:30-1:45 MSPB (ILB) 350	**Office hours:**	TBA

Course description

This course provides an introduction to linear algebra. Topics include systems of linear equations, matrices, Gaussian elimination, rank, linear independence, subspaces, basis, dimension, linear transformations, determinants, eigenvalues and eigenvectors, change of basis, diagonalization, the abstract concept of a vector space, and applications. Core Course.

Course materials

The textbook is *Linear Algebra with Applications* by Holt, second edition. An older first edition would also be fine, although some of the homework problem numbers have changed.

Learning Outcomes

At the completion of this course, each student should be able to...

1) Solve systems of linear equations.
2) Determine whether or not a set with given operations is a vector space or a subspace of another vector space.
3) Determine properties of sets of vectors such as whether they are linearly independent, whether they span, and whether they are a basis.
4) Perform fundamental operations in the algebra of matrices, including multiplying and inverting matrices.
5) Use and apply algebraic properties of a linear tranformation.
6) Determine geometric information about a linear transformation, including computing determinants, eigenvalues, and eigenvectors.

Topics

We will cover the topics outlined on the **Course Standards** sheet provided to you, in the order that they appear on that sheet. These topics are taken from the first seven chapters of the textbook, but are arranged in a more efficient order.

Attendance Policy

Attendance is required for this course, and will be tracked each day. "Perfect" attendence is considered anything greater than 80% to account for a small number of short term absences for any reason. You are responsible for maintaining records of any excused absences, but you should only present these records to me if your attendence drops below 80%.

Standards Based Grading

This course is graded by a methodology called **standards based grading**. Instead of receiving one percentage grade for an assessment, you will be assessed on whether or not you mastered individual **learning standards**. A list of these 23 standards is available in USAOnline. Your grade in the course will be based on how many of these standards you demonstrate mastery of. **On each standard, you will have the opportunity to earn up to two checkmarks; the total number of checkmarks you earn will determine your grade** (see below).

Feedback

On a written assessment, you will not receive a score or a percentage. There will be a list of the standards that were covered on that assessment, and a number or symbol next to each one.

- A **M** means you successfully demonstrated **Mastery** of that standard. Great job! Check off another box on your progress sheet.
- A ***** means you have a minor mistake, unrelated to the standard being assessed. For example, if you make a single arithmetic error while row reducing a matrix but do everything else correctly, you will earn a *. If you receive a *, I won't give you any other feedback on that problem. If you can determine your mistake on your own, and come explain it to me in my office hours and finish the problem correctly, then I will modify the * into a M. **This must be done in the week following the assessment**. After a week, the * will be treated the same as an R.
- A **R** means you are eligible to **Reassess** in my office hours. You will earn this mark if you made a good faith attempt and demonstrated partial understanding, but did not demonstrate full mastery of that standard on this assessment. You should work some more practice problems, and come by my office hours if you still do not understand. You can either wait for the next quiz, or reassess during my office hours (see "Reassessments" below).
- A **N** means there was **No Significant Evidence** of understanding, and you are **Not Eligible** for an office hours reassessment on this standard. Your next attempt must come on an in-class assessment.

Unfortunately, this grading system is far too sophisticated for USAOnline's gradebook to handle. So you will periodically receive an automatic email from me detailing your current progress in the course. If you have any questions about how to interpret where you stand, come to my office hours to discuss.

Reassessment

You will have multiple opportunities to demonstrate mastery of each standard. Your first opportunity will be on one of the daily quizzes.

1) Each standard will show up on quizzes four times, beginning the class day after it is discussed in class (except, of course, standards that we cover in late November). Usually these four appearances will be in subsequent weeks, but this is not a strict rule. **A detailed schedule listing when exactly which day each standard appears on quizzes is posted in USAOnline.**
2) There will be a midterm in class on Tuesday, October 10, a semifinal assessment the last week of class, and the final exam. The midterm will be an opportunity to demonstrate mastery on any standard from the first three modules, while the semifinal and final exam will have every standard available.
3) Additionally, if you receive an R on a standard, you can come to my office to reassess the standard. There are a few caveats to office hour reassessments:
    - In order to reassess a standard in my office, you must have completed additional practice problems and **fill out a reassessment form** (blank forms are available in USAOnline).
    - **Office hour reassessments are given at the discretion of the instructor, they are not guaranteed opportunities.**

- **You can only reassess one standard per day** (or perhaps two closely related standards that can be assessed by a single problem).
- **There will be no office hours reassessments during the week of the midterm.** I ask you to instead wait a few days and demonstrate mastery on the exam, so my office hour time during exam week can be devoted to answering questions helping everyone understand the new material.
- If you come in for help on a standard, you should come back at a later time to reassess it after you have practiced it some more on your own. But you may certainly ask for help on one standard, and then demonstrate mastery of a different one during the same visit.
- **Reassessment opportunities may be limited by practical considerations like time limitations and fairness to your classmates, particularly towards the end of the semester.** I do my best to accommodate everyone, but this is especially difficult at the end of the semester. **Students from previous semesters say the best thing you can do is to start reassessing early in the semester**.
- I will try to schedule extra office hours during finals week, but the last day for office hour reassessments will be Tuesday, December 5. As with the midterm, I want to be sure my office hours the day before the final are available to answer any questions or clear up any last difficulties.
- You can certainly demonstrate mastery of a standard for a second time in my office hours; however, to qualify it must occur in a subsequent week after you first mastered the standard.

Assessments

There will be three kinds of in class assessments:

- As mentioned above, **each day we will have a quiz** in the last 15 minutes of class giving you opportunity to master several standards. Note that you must have participated in class that day to be eligible to take the quiz. A schedule listing which standards will appear on which quizzes is available in USAOnline.
- There will be a **midterm exam on Tuesday, October 10** and a **final exam on Thursday, December 7 at 1:00**.

Grading

At the end of the semester, your grade will be computed in the following manner.

To earn a letter grade of ...	... you should at least do ALL of the following...	OR do this.
A	• Earn 40 mastery checkmarks; • Complete 10 homework reports; • Have an 80% attendence record.	Earn 45 mastery checkmarks
B	• Earn 35 mastery checkmarks; • Complete 8 homework reports; • Have an 80% attendence record.	Earn 40 mastery checkmarks
C	• Earn 30 mastery checkmarks; • Complete 6 homework reports; • Have an 80% attendence record.	Earn 35 mastery checkmarks
D	• Earn 20 mastery checkmarks; • Complete 4 homework reports; • Have a 50% attendence record.	Earn 25 mastery checkmarks
F	• Not fit in the above categories.	

Homework

The only way to learn mathematics is to do mathematics; for this reason, I will regularly provide you with homework problems. **These are for your own practice.** You are not asked to hand these in for a grade. Instead, you are expected to turn in a homework report each week (blank ones are available in USAOnline). In the report, you will list problems you've worked on for practice, and ones you are still having trouble with. **Homework reports are due every Thursday at the beginning of class.** Late homework reports will not be accepted.

Missed Exams and Coursework

The midterm and final exams can only be made up in the event of illness (with a doctor's note), or other emergent situation (with appropriate documentation). The definition of "emergent" is at the discretion of the instructor. Quizzes can only be made up if several in a row are missed due to an acceptable excuse as defined above.

Calculator Policy

Calculators of any sort may be used on exams provided that the calculator cannot make phone calls, send text messages, or access the internet. A calculator that performs row reduction of matrices will be useful. You will only receive credit on standards for which you show all your work, but you may use a calculator to skip any details that have been assessed on another standard. For example, you can use a calculator to row-reduce a matrix, unless the standard being assessed is row reduction itself.

Student Academic Conduct Policy

All students are expected to adhere to the Student Academic Conduct Policy, which you can view at `http://www.southalabama.edu/bulletin/current/student-affairs/conduct.html`. Students violating this policy will be given one or more of the following penalties based on the severity of the offense: 1) Loss of all mastery checkmarks on all standards affected by the misconduct; 2) Reduction in final course grade by a letter grade; 3) Automatic course failure.