Math 237
Linear Algebra

Course information:	Math 237 – Linear Algebra Spring 2020 Course format: Web-enhanced	**Instructor:**	Dr. Drew Lewis `drewlewis@southalabama.edu` 439 MSPB
Meeting times:	(101) MWF 9:05-9:55 (102) MWF 11:15-12:05 (103) MWF 1:25-2:15	**Office hours:**	MWF 8:15-9:00, 10-11:00, or by appointment

Student Success

I am committed to helping each and every one of you achieve your goals. I fundamentally believe that **everyone is a math person** and is capable of succeeding in this course. If there is something we could do differently that will help you succeed, please come talk to me.

There are many services on campus to help you succeed. I enthusiastically support the mission of our Office of Student Disability Services; if you are registered with them, please come speak to me in office hours so I can ensure I am doing everything needed to enable your success.

Basic Needs Security

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to contact the Dean of Students for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable me to try and provide information on accessing additional resources. Information on the campus food pantry is available at `https://southalabama.edu/departments/sga/foodpantry.html`.

Office Hours and Instructor Availability

Office hours are times I have specifically set aside to be available for you to drop-in to ask questions, attempt reassessments, or talk with me about anything else. They would probably be better named **Student Hours**. I have six scheduled office hours each week; if you cannot make any of these six hours and need to meet with me at a different time, **send me an email to schedule a time**. This will ensure it gets on my calendar and does not get forgotten.

I make every effort to keep my regular posted office hours, but occasionally I have to cancel them (due to travel or a sick child, most often). In this case I will post a notice in Campuswire.

I am generally in the office from 8:15-4:15 on weekdays, but this does not mean I am always available. If you request an appointment, please list several times that would work for you in your initial request.

Email Availability

I generally respond to emails within one working day. Do not expect a reply to an email sent outside of business hours until the next day.

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.

Learning Outcomes

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

1) Work collaboratively on difficult mathematics problems

2) Solve systems of linear equations.

3) Determine whether or not a set with given operations is a vector space or a subspace of another vector space.

4) Determine properties of sets of vectors such as whether they are linearly independent, whether they span, and whether they are a basis of a given subspace.

5) Perform fundamental operations in the algebra of matrices, including multiplying and inverting matrices.

6) Use and apply algebraic properties of a linear transformation.

7) Determine geometric information about a linear transformation, including computing determinants, eigenvalues, and eigenvectors.

General Education Learning Outcomes

This course addresses the following university-wide learning outcomes in quantitative reasoning:

1) Students will evaluate information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).

2) Students will convert relevant information into various mathematical forms (e.g., equations, graphs, diagrams, tables, words)

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 logical order.

Textbook

The suggested textbook is "Elementary Linear Algebra with Applications" by Kolman and Hill. This will serve as a supplement to the instructor-provided notes I post in Campuswire. A free alternative is "Linear Algebra" by Hefferon, available at `http://joshua.smcvt.edu/linearalgebra/book.pdf`.

Attendance Policy

Attendance is required to be successful in this course, and will be tracked each day. "Perfect" attendance is considered anything greater than 80% to allow 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 attendance drops below 80%.

Team-Based Learning

This class is taught by a method called **team-based learning**. You will be assigned to a team that you will work with on various activities in class each day. The course is divided into **5 modules**.

- Before each module begins, **you will be responsible for ensuring your own readiness for the module**. A list of learning outcomes for the readiness assurance process is available in Campuswire; you should be able to do each of these things before coming to class on the first day of the module. Some of these readiness assurance outcomes are new material, some of these readiness assurance outcomes are topics from previous classes, and some are topics from earlier in this class. Along with these outcomes in Campuswire are some preparation resources (videos or reading material) to help you prepare.

- The first day of each module will be dedicated to the **Readiness Assurance Process**. The dates for the RATs are located in the course calendar.

  On these days, you will first take an **Individual Readiness Assurance Test (iRAT)**. After submitting this, working with your teammates you will retake the same test as the **Team Readiness Assurance Test (tRAT)**. These are not "tests" in the traditional sense; they are designed to measure if you are prepared for the team activities on subsequent days.

- On the other class days, you will work with your teammates on a series of activities designed to guide you through discovering the course material.

- To help your team improve in its collaboration throughout the semester, we will use a **peer evaluation** process. Several times during the semester, you will fill out a survey (through the TEAMMATES website) evaluating your peers. You will also receive written feedback given by your peers on these surveys (in an anonymized form), to help you maximize your future contributions to the team.

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 24 standards is available in Campuswire. 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 letter or symbol next to each one.

- An **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 **W** means your work was correct, but your exposition was lacking in some way–most often this is poor or ambiguous notation, or a missing step. You need to **write out a complete solution** to the problem on a W form (available in Campuswire), staple this to the original assessment and bring it to me. Like a *, this must be done within a week of the assessment, or the W will revert to 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. This is the most rarely used mark.

Unfortunately, this grading system is far too sophisticated for the gradebook in USAOnline 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.

1) Each week we will have either a short assessment ("quiz"), covering up to 4 standards, or a long assessment ("exam"), covering all of the standards discussed so far. **A detailed schedule listing exactly which day each standard appears on quizzes is posted in Campuswire.**

2) There will be a final exam, which will be your final opportunity to demonstrate mastery.

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 Campuswire). If you come to my office without a reassessment form, you must complete one and come back later.

   - **Office hour reassessments are given at the discretion of the instructor, they are not guaranteed opportunities.**

   - **You can only reassess one standard per day**. Past experience has shown that students have a higher success rate by focusing on one standard for a reassessment, then moving to another after they have mastered it.

   - **There will be no office hours reassessments the same day as an exam.** I ask you to instead wait and demonstrate mastery on the exam, so my office hour time can be devoted to answering questions helping everyone understand the 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.

   - I am trying to gauge how many people read this far, and when. Please email me a picture of your favorite dinosaur when you read this. Also, please don't mention it to your classmates.

   - **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 two days before your final exam**. 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 two kinds of in class assessments:

- As mentioned above, at the end of most weeks will be either a quiz or exam; barring unforseen events (e.g. weather days) there will be 10 quizzes and 4 exams. The dates for each, including which standards will appear on which quizzes, is available in the Course Calendar in Campuswire.

- The **final exam** times are listed on the University website and the course calendar. These times are set by the university and cannot be altered by individual instructors.

Calculator Policy

Calculators of any sort may be used on exams provided that the calculator cannot make phone calls, send text messages, access the internet, or otherwise communicate with other devices. A calculator that can perform row reduction of large matrices is highly recommended.

Missed Classes, Exams and Coursework

As mentioned above, infrequent absence (e.g. due to intermittent illness) will not affect your course grade. However, it is generally considered polite to send your instructor a short email when you know you will miss class.

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. Office hours reassessments can be used for additional opportunities subject to the restrictions detailed above.

Readiness Assurance Tests will not be made up. An unexcused absence will result in a 0 for both the iRAT and tRAT scores; otherwise the missed iRAT will be dropped and your team's tRAT will be counted for you.

The above applies to the typical case of infrequent, intermittent absences. Should you have to be absent for an extended period of time for any reason, please come discuss with me as soon as possible so we can make alternate arrangements.

Grading

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

To earn a ...	... you should
A	Earn 45 mastery checkmarks;
B	Earn 40 mastery checkmarks;
C	Earn 35 mastery checkmarks;
D	Earn 30 mastery checkmarks;
F	Not fit in the above categories.

Alternative Grading

If you do not feel the mastery checkmarks accurately reflect your mastery of the learning outcomes in the course, you can email me to set up an appointment during finals week to consider an alternate grading. At this meeting, you should be prepared to present evidence of your mastery of the learning outcomes of the course.

Homework

The only way to learn mathematics is to do mathematics; thus, our class time is centered around students doing mathematics. Additionally, you will require practice outside of class; a list of suggested exercises corresponding to each standard is available in Campuswire. Your textbook also contains many more exercises.

I will neither collect nor grade homework, as past experience has not shown this to be a good use of instructor or student time. Instead, you should work as many problems as you need to. On your weekly self-assessment report (see below), you should indicate which problems you practiced. If you need feedback on your homework problems, bring them to my office hours and I will be happy to discuss them with you.

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.