MAT 260-010 LINEAR ALGEBRA
COURSE OUTLINE

WING HONG TONY WONG

1. Contact Information

Office:	Lytle Hall 213
Office hours:	MWF 10:00 a.m.–10:50 a.m. and MW 1:00 p.m.–1:50 p.m., or by appointment
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Course website:	http://faculty.kutztown.edu/wong/19SpMAT260/

2. Course Description

Catalog description

This course gives the student an opportunity to make an in-depth investigation of a specialized area of mathematics which has widespread practical applications in the arts and sciences but still allows work with abstract concepts. Topics include a study of the properties of vector spaces; matrix theory with applications using systems of equations and determinants; linear transformations and invariants under such mappings. Students will be required to use appropriate computer software.
Prerequisite: Completion of MAT 224 or CSC 225 with a grade of C or higher.

Course objectives

This course is an introductory course to higher mathematics. Concepts and tools learnt in this class are widely applied in frontier research. Hence, this course will stress on **writing mathematical proofs**, on top of computations.

Some topics that may be covered in this course include

- abstract vector spaces and their structures;
- simple matrix theory, such as matrix operations and determinants;
- linear transformations and change of basis.

Textbook

Elementary Linear Algebra, 10$^{\text{th}}$ Edition, Howard Anton.

Chapters to be covered (tentative)

Sections 4.1–4.2, 1.1–1.7, 2.1–2.3, 4.3–4.8, 3.1–3.5 (4.9–4.11, 5.1–5.2 if time allows).

Date: Wednesday, January 23, 2019.

Mathematica
Students are strongly encouraged to download and play around with Mathematica, a easy-to-use computer software which can do mathematics computation, graphing and much more. In fact, Mathematica is so powerful that it is often used in frontier mathematics research. Kutztown students have the privilege to download Mathematica 11 for free from http://download.kutztown.edu. It is available in Linux, Mac and Windows versions.

Grading policies
Homework: Homework will be given on Wednesdays. Students are required to write down their **full solutions** for each problem clearly. On the subsequent Wednesday, a few students (either chosen by me or on a voluntary basis) will present on the document camera their work on some particular problems. Students in the audience are required to ask questions, make comments or give compliments to the presenters. Each presenter will earn a maximum of 5 points for their presentation, up to a maximum of 10 points in the semester. Grading will be according to the amount of efforts shown on the assigned homework problem. Even if you do not know how to solve the homework problems completely, you should keep working on them from different perspectives, so that you can show me all the methods you have tried. (*Philosophy:* This practice is not to put pressure on students. Rather, I would like to encourage students to learn from their peers. It is perfectly fine if there are mistakes in the homework. In fact, it is great if there are mistakes in the homework shown, since they can help the whole class to learn and do well in tests and exams. However, in order for this practice to succeed, students must all make good efforts in their homework.)

Students are required to make remarks or corrections on their own homework scripts after discussions. Some problems may be required to be handed in on Friday for grading. The score of the submitted homework will be combined with that of the quiz.

Participation: 20 points will be allocated for class participation.
(*Philosophy:* The aim is to encourage everyone to actively contribute to the class. I will be very lax in this category, but I hope this will serve as a good incentive for the class.)

Quizzes: A short quiz (around 10 minutes) will be given in class on Fridays, and those problems come directly from the homework (with possibly minor changes). Each quiz is worth 5 points.

Test: There will be three tests in this course, each is worth 25 points.

Final: There will be a 2-hour final at 8:00 a.m. on Friday, May 10, 2019. The final exam is worth 50 points.

Warning: Illegible handwritings are taken as wrong and will be automatically be ignored during grading.

The full score of the course is given by the following. It may vary slightly when the semester progresses.

Homework Presentation	10
Participation	20
Quizzes (around 9 quizzes with 5 points each)	45
Tests (3 tests with 25 points each)	75
Final	50
Full Score	200

Your final score will be calculated by simply adding up all the points from homework, presentations, participation, quizzes, tests, and the final, plus possible bonuses (introduced below). This score will be divided by the full score for a percentage, and the final letter grade will be assigned according to the following scale.

93% and above	A	(4.00)
90% to 92.99%	A-	(3.67)
87% to 89.99%	B+	(3.33)
83% to 86.99%	B	(3.00)
80% to 82.99%	B-	(2.67)
77% to 79.99%	C+	(2.33)
70% to 76.99%	C	(2.00)
60% to 69.99%	D	(1.00)
Below 60	F	(0.00)

Note: By the university policy, if there is no attendance or participation in the course after week 9 (March 29, 2019), you will automatically get an unearned failing grade.

3. Course Policies

Attendance
You are strongly recommended to attend every class, since the course will go fairly fast. If you miss a quiz, a test or the final exam without a valid reason (the validity will be at the discretion of the instructor), you may **not** be able to make up for it. If you do have a valid reason, you must inform me **before** the quiz or test. If you are seriously ill and need to reschedule your quiz, test or exam, you must provide me a written proof from a physician or the college nurse as soon as possible.

Bonuses
As an encouragement for students to pay attention in class, the first student who notifies me a mistake I make on the blackboard will be awarded with 0.5 point bonus, which is to be added directly to the final score.

Classroom discipline
Students are strongly encouraged to raise questions related to the course content or mathematics in general. However, any act of disturbance in class, such as making an unacceptable amount of noise, will not be tolerated. The student who performs such act will first receive a warning, and if such act persists, the student may receive 10 points deduction in the final score.

Cell phones
Cell phones must be turned off in class. Anyone using their cell phone or allowing their phone ringing or vibrating in class may receive 10 points deduction in the final score for each occurrence.

Use of calculators, computers, and other tools and resources
You may use all resources in your homework, including and not limited to calculators, computer programs (such as Mathematica), the internet, and your friends. However, all these resources **are not allowed** in tests nor in the final exam. Therefore, I encourage you not to rely on these resources when you do your homework, or else you lose your chance to practice on these problems.

Academic honesty
Students are expected to demonstrate their mastery of subject matter honorably. Any acts of academic dishonesty by students, such as plagiarism on written papers or cheating on exams, threaten to undermine the educational and ethical goals of the University for its students. Such violations are of the utmost seriousness and **may result in failure in the course**.

Support for students with disabilities
If you have already disclosed a disability to the Disability Services Office (215 Stratton Administration Building) and are seeking accommodations, please feel free to speak with me privately so that I may assist you. If you have an injury sustained during military service including PTSD or TBI, you are also eligible for accommodations under the ADA and may contact the Disability Services Office.

Gender-based crimes
Educators must report incidents of gender-based crimes, including sexual assault, sexual harassment, stalking, dating violence, and domestic violence. If a student discloses such incidents to me during class or in a course assignment, I am not required to report the disclosure, unless the student was a minor at the time the incident occurred. Regardless of the student's age, if the incident is disclosed to me outside the classroom setting or a course assignment, I am required by law to report the disclosure, including relevant details, such as the names of those involved in the incident, to Public Safety and Police Services and to Mr. Jesus Peña, Title IX Coordinator.

4. Key to success

This course is hard, and you have to be well-prepared for that. Starting from day one, all theorems and techniques are building, one upon the other. You must understand and remember every single fact we learnt in class in order to succeed. One big piece of advice is to keep a tidy, concise, and accurate note of all important facts, theorems, and formulae that we went through in class. This helps your future revision tremendously.

Read the corresponding sections in the textbook after each class. Work on the homework problems individually for a substantial amount of time before you collaborate with the others. Otherwise, you will not have enough understanding in the materials, and you cannot

do well in the quizzes. You are also encouraged to work on more problems than what I have assigned as homework.

Be attentive in class, rather than just attending the class. If you have any questions, do not be shy to raise your hand. Very often, the question you want to ask is also a question in your classmates' mind, so you are helping the whole class by asking questions.

From my own experience, working in pairs is the most efficient way for studying. Find a good study partner, who has similar ability and interest as you do early on in this semester, and make sure you spend at least 3 to 6 hours studying with your study partner every week.

Help is always there for those who ask for it. I am always available outside classroom. Email me, come to my office hour, or even just drop by my office if you have trouble with catching up with the pace in class.