Math0280: Introduction to Linear Algebra
Tuesday Class, Spring Semester, 2019

INSTRUCTOR: Dr. Tsun-Zee Mai; **OFFICE:** Rm 4-224; **EMAIL:** tmai@scu.edu.cn
OFFICE HOURS: TWR 2:00pm – 4:30pm at Rm 4-224, or by appointment.
LECTURES: Tuesdays 9:0am – 11:55am at Rm 4-216
TEXTBOOK: *David Poole: Linear Algebra, A Modern Introduction, 4th ed.*
DESCRIPTION: Fundamentals of matrices and vectors in Euclidean space. Topics include solving linear systems of equations by direct methods (Gaussian Elimination, and partial pivoting) and iterative methods, matrix algebra, inverses, determinants, eigenvalues and eigenvectors. Also covers the basic notions of span, subspace, linear independence, basis, dimension, linear transformation, range, null-space, and orthogonalization. Some advanced topics such as QR factorization and SVD will also be introduced. Use of the computer software, MATLAB, will be an integral part of this course.
General Student Learning Outcomes: In this course, students will

- Become familiar with scholarly and research methods.
- Develop effective written communication skills.

Course Student Learning Outcomes: The course is designed to provide a foundation in both computational and theoretical linear algebra. At the conclusion of the course, the student will be able to

- Perform Gaussian Elimination with partial pivoting to solve a linear system.
- Understand the concept of iterative methods for solving linear systems.
- Perform matrix and vector operations, and find vector norms.
- Find the eigenvalues and eigenvectors of matrices with real coefficients by hand and using MATLAB.
- Find bases for the range and nullspace of matrices with real coefficients by hand and using MATLAB.
- Interpret geometrically properties of matrices such as eigenvalues, eigenvectors, nullspace, and range.
- Determine if a set of vectors is linearly independent, orthogonality, or form a basis for a vector space.
- Prove that a set of vectors is a subspace including the range and nullspace of a linear transformation.
- Verify and prove the rank plus nullity theorem.
- Classify matrices as symmetric, Hermitian, normal, or unitary.
- Perform Gram-Schmidt Orthogonalization procedure.
- Find the orthogonal complement, using MATLAB, of a subspace in a finite dimensional vector space.

GRADE: The final grade will be based on the **score** which is a number between 0 and 100 determined by

Homework: 15% Quiz: 10% Major Exams: 45% Final Exam: 30%

A: 90 – 100	A−: 85 – 90	B+: 80 – 84	B: 76 – 80	B−: 73 – 76
C+: 70 – 73	C: 66 – 70	C−: 63 – 66	D: 60 – 63	F: < 60

EXAMS: There are two major 90min tests and a final exam. Each major test will emphasize material since the previous exam, but may include anything covered previously. Each test may earn bonus points if the following test score is higher. The bonus is half of the difference of the two exams. There is no bonus for the final exam, but the lowest adjusted test score may be replaced by the final exam score if the final is higher. Here is an example: if a student's grades are: HW(88), QZ(80), tests (70, 80), and final (78), then the adjusted test scores will be 75, 80; the lowest adjusted test score 75 is replaced by 78. Thus the student grade determination is 85 × 15% + 80× 10% + (78+80)/2 × 45% + 78 × 30% = 80.15 which is a B+. The final exam will be comprehensive. There is **NO** Make up for all the exams.

Tentative exam dates are the following:

TEST 1: Week of 4/8	TEST 2: Week of 5/27
	FINAL: TBA in the week of 6/24

ASSIGNMENTS: Homework assignments and their due dates will be given in the lectures. Homework must be ***written in a neat form***, Homework must be turned in **BEFORE** the lectures on the due dates. **NO LATE homework** (no matter what excuses you may have) will be accepted. Using MATLAB to do your homework is strongly encouraged, because you will use MATLAB for your tests.
MAKEUP FOR THE COURSE: Only students who made a score of 50 - 59 are eligible to take a makeup exam for the course. If the makeup course exam is successful, the course grade will be changed to D. For students whose scores are lower than 50 are not eligible to have a makeup exam for the course.

ACKNOWLEDGEMENT FORM: Every student must sign an acknowledgement form to acknowledge you have read and understood the course rules and policies. You also acknowledge that you will follow the rules and policies of the course.

ATTENDANCE: You are expected to attend all the classes. I will check the attendance but will not be used toward your grade. A student who misses a class is responsible for finding out what was covered in the class.

ACADEMIC MISCONDUCT: All students in attendance at the SiChuan University are expected to be honorable and to observe standards of conduct appropriate to a community of scholars. The University expects from its students a higher standard of conduct than the minimum required to avoid discipline. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student. These include, but are not limited to, cheating, plagiarism, fabrication of information, misrepresentation, and abetting any of the above. The Academic Misconduct Disciplinary Policy will be followed in the event that academic misconduct occurs. Students should refer to the Student Handbook.

NON-ACADEMIC MISCONDUCT: All cell phones and other electronic devices are to be turned off and out of sight while you are in the classroom. All newspapers and other materials not related to the class are to be put away once class begins. Operating these devices and reading unrelated materials while in class is disrespectful of your instructor and fellow classmates. If you fail to abide by this rule, the instructor has the right to confiscate the device or materials. If you have an emergency and need to have your phone turned on during class, ask your instructor for permission

Tentative Progress		
WK	Topic Sections	Week of
1	1.1 – 1.3	2/25
2	2.1 – 2.2	3/4
3	2.3 – 2.4	3/11
4	2.5; 3.1	3/18
5	3.2 – 3.3	3/25
6	3.3	4/1
7	Test1	4/8
8	3.4 – 3.5	4/15
9	3.5 – 3.6	4/22
10	4.1 – 4.2	4/29
11	4.3 – 4.4	5/6
12	4.5; 5.1	5/13
13	5.2 – 5.3	5/20
14	Test 2	5/27
15	5.3 – 5.4	6/3
16	7.2 – 7.3	6/10
17	Review	6/17
18	Final Exam	6/24

Format of Homework:

1. **First line (bold) must be <u>typed</u> the assignment number and due date**
2. **Second line (bold) must be <u>typed</u> your class section, your name and student ID number**
3. **You must copy every homework question and work IN ORDER**

Linear Algebra **Homework #01** **3/5/2019**
Section: Tuesday **Name: George Washington** **ID#201731012345**