Math 340 Syllabus, Summer 2020
Elementary Matrix and Linear Algebra, Lecture 1

Course Information
Elementary Matrix and Linear Algebra: Math 340, Lecture 1 (3 Credits) Summer 2020

Instructor: Dr. Sharad Chandarana (chandara@wisc.edu), B127 Van Vleck Hall
Office hours: M, Tu, W, Th 10:20am-11:00am
Location and Schedule M, Tu, W, Th 8:55am to 10:10am in 6203 Social Sciences
Textbook Elementary Linear Algebra (9th Edition) by Kolman and Hill, Prentice Hall

Description
Matrix algebra, determinants, vector spaces, inner product spaces, linear transformations, eigenvalues and eigenvectors.

Prerequisite(s) Math 234 or Math 222 and 240.

Course Designations
Level Advanced, L&S Credit - Counts as Liberal Arts and Science credit in L&S
Breadth: N - Natural Science
Instruction Mode Classroom Instruction

Department MATHEMATICS
College Letters and Science

How the Credit Hours are Met
This class meets four days of the week (75 minutes for lectures M, Tu, W, Th) over the Summer semester (6-15-2020 through 8-9-2020) and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for at least 3 hours outside of classroom for every class hour.

GRADING

Exam Dates

Exam 1: Thursday, July 2
Exam 2: Thursday, July 23
Exam 3: Thursday, August 6

Grading
Exam 1: 30%
Exam 2: 30%
Exam 3: 30%
Homework: 10%
Course Learning Outcomes

We expect that a student can do all of these after taking this course:

1. **Matrix Algebra**: Perform matrix addition, subtraction and multiplication and elementary row operations; solve linear systems of equations using row reduced echelon form of a matrix and invertible matrices; find the inverse of a matrix using row operations and understand properties of invertible matrices.

2. **Determinants**: Find the determinant of a matrix using the definition, the properties of determinants and cofactor expansion; understand the relationship between the determinant and the invertibility of a matrix; and solve a system of linear equations using determinants.

3. **Real Vector Spaces**: Understand the algebraic structure of a vector space over the real numbers and its subspaces and the span of a set of vectors; linear independence and linear dependence of vectors; find the basis and dimension of a finite dimensional vector space; find the null space, the nullity, the column space and the rank of a matrix; understand coordinates, isomorphisms and change of bases and compute transition matrices.

4. **Linear Transformations**: Understand the definition and the properties of a linear transformation between two vector spaces; find the kernel and the range of a linear transformation and the relation between their dimensions; find the matrix of a linear transformation.

5. **Eigenvalues and Eigenvectors**: Find eigenvalues and eigenvectors of a linear operator and of a square matrix; diagonalize a linear operator and a square matrix.

6. **Inner Product Spaces**: Find the inner product of vectors and the angle between two vectors in an inner product space; and find an orthonormal basis for a finite dimensional inner product space using Gram-Schmidt process. (time permitting)

ACADEMIC POLICIES

ACADEMIC INTEGRITY

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison’s community of scholars in which everyone’s academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to [https://conduct.students.wisc.edu/academic-integrity/](https://conduct.students.wisc.edu/academic-integrity/)

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

McBurney Disability Resource Center syllabus statement: “The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student’s educational record, is confidential and protected under FERPA.” [http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php](http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php)

DIVERSITY & INCLUSION

Institutional statement on diversity: “Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture,
background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background—people who as students, faculty, and staff serve Wisconsin and the world.” [https://diversity.wisc.edu/](https://diversity.wisc.edu/)