Math 340, Elementary Matrix and linear Algebra
Number of Credits: 3 credits
Course URL: http://www.math.wisc.edu/~maxim/340S18.html

Course Designation or Attributes: None

Meeting Time and Location: MoTuWeTh 10:20-11:35 in Soc Sci 6102.

Instructional Mode: Face to face

Credit hours: The three credit hours are met by four 75-minute meetings and a minimum of four hours of out of class student work per week for 8 weeks.

INSTRUCTOR:

Laurentiu Maxim, Professor
Office hours and location: Monday 2:30-3:30PM, Van Vleck Hall 713

Email: maxim@math.wisc.edu

OFFICIAL COURSE DESCRIPTION

Math 340 is our standard Linear algebra course for non-math majors. Math majors are also allowed to take Math 340 for their requirements, although the more theoretical, proof-based Math 341 is recommended in their case. Math 340 covers the principles of linear algebra and the theory of matrices with an emphasis on understanding the concepts and being able to perform calculations. Some proofs are also introduced in Math 340.

Requisites
Math 234 or Math 222 & 240.

LEARNING OUTCOMES

At the end of this course students should be able to:

- *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.

- *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.

- *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.

- *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.

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

- *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.

Textbook and Software

Elementary Linear Algebra with Applications (9th Edition), by B. Kolman and D. Hill. Publisher: Pearson; ISBN: 9780132296540.

GRADING:

The course grade is based on quizzes and 2 midterm exams.

- Quizzes 30%
- Midterm I 35%
- Midterm II 35%

There will be 6 quizzes, 30-minute each. The lowest quiz score will be dropped.

EXAMS

The due dates for Midterm I and II are July 12 and August 18. The midterms will be taken during the regular class time. Use of phones, tablets, laptops or calculators will not be allowed during exams. You must bring a valid UW Photo ID to all exams.

If you are eligible for special consideration on exams, please let me know as soon as possible, so that I can ensure that your needs are accommodated. Students holding McBurney visas will take their exams at the Testing Center.

Make-up midterm exams will be considered only if there is a conflict with another university-related event (in which case you need to contact me as soon as possible), or a last-minute medical/family emergency (you need to show proof of such emergency, e.g., doctor's notes).

HOMEWORK & OTHER ASSIGNMENTS

Homework will be assigned weekly, and it will be posted at the url: http://www.math.wisc.edu/~maxim/340S18.html

Homework will not be collected or graded. However, the quizzes in discussion will be based on these assignments, so completing the assignments is essential for learning the class material.

RULES, RIGHTS & RESPONSIBILITIES

- See the Guide's to Rules, Rights and Responsibilities.

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/.

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

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/