Math 340 Syllabus

Elementary Matrix and Linear Algebra

COURSE INFORMATION

Elementary Matrix and Linear Algebra
MATH 340, 001 and 002
3 Credits, satisfied through two 75-minute class meetings each week during the semester.
Fall 2019

Description
Matrix algebra, linear systems of equations, vector spaces, sub-spaces, linear dependence, rank of matrices, determinants, linear transformations, eigenvalues and eigenvectors, diagonalization, inner products and orthogonal vectors, symmetric matrices. Prospective math majors should instead consider Math 341 for a proof based introductory linear algebra course.

Requisite(s):	Math 222. Not open to students with credit for either Math 341 or Math 375.
Course Designations and Attributes:	Breadth – Natural Science Level – Advanced L&S Credit – Counts as Liberal Arts and Science credit in L&S
Instruction Mode:	Face-to-face
Location and Schedule:	VAN VLECK B130 TR 9:30AM–10:45AM (Section 001) or VAN VLECK B130 TR 1:00PM–2:15PM (Section 002)
Required Textbook:	Kolman & Hill, *Elementary Linear Algebra with Applications*, Ninth Edition.

Department:	MATHEMATICS
College:	Letters and Science
Canvas URL:	https://canvas.wisc.edu/courses/161785

Instructor: Trevor Leslie (Van Vleck Visiting Assistant Professor), `tleslie2@wisc.edu`
Office Hours:

- Tuesdays 11:00AM–11:50AM, Van Vleck 903
- Wednesdays 11:00AM–11:50AM, Van Vleck B325
- By appointment, Van Vleck 407 (my office).

On Tuesdays and Wednesdays, I will go back to my office if no one is in the reserved rooms at 11:00AM. So, if you show up and don't see me, check my office.

TA's:
Haider Barq, `barq@wisc.edu`,
Office Hours: Wednesdays 5:00PM–6:00PM and by appointment, 818 Van Vleck.
Tejas Bhojraj, `bhojraj@wisc.edu`,
Office Hours: Fridays 12:00PM–1:00PM and by appointment, 101-25 Van Vleck.
Nathaniel Buswell, `nbuswell@wisc.edu`,
Office Hours: Mondays 9:45AM–11:45AM and by appointment, 422 Van Vleck.
Chiahui Cheng, `ccheng46@wisc.edu`,
Office Hours: Mondays 12:00PM–1:00PM and Wednesdays 1:00PM–2:00PM, 820 Van Vleck.
Josiah Jacobsen-Grocott, `jacobsengroc@wisc.edu`,
Office Hours: Fridays 1:00PM–2:00PM and by appointment, 516 Van Vleck.

The 'by appointment' option should be used sparingly, since you can go to any of the office hours listed above.

GRADING AND COURSE MATERIALS

Contribution of Course Components to Final Grade: Written Homework (15%), Quizzes (11%), Two midterm exams (22% each), One final exam (30%)

Grade Cutoffs: The percentages below will guarantee you the following grades:

≥ 92	A	≥ 88	AB
≥ 80	B	≥ 74	BC
≥ 62	C	≥ 50	D

I reserve the right to lower the cutoffs listed above (but I will not raise them).
A possibly more useful metric: The historical average GPA for the course is around 2.85. If necessary, I will adjust the cutoffs at the end of the semester so that the class average is not lower than a 2.80.

Course Materials: Course materials (Syllabus and Course Schedule, Assignments and Solutions, Supplementary Course Notes, etc.) will be posted on Canvas at the url listed above. All of these except the Supplementary Course Notes will also be posted on the 'Teaching' page of my personal website: https://sites.google.com/a/wisc.edu/trevor-leslie/teaching .

Written Homework: (Updated 9/24/2019 to reflect new submission procedure) There will be seven homework assignments over the course of the semester. See the course calendar (separate document) for the list of due dates. *Not all problems will be graded.* Instead, I will choose a few problems of varying difficulty and instruct the graders and TA's to grade those.

Deadlines: Homework will be due during lecture on the deadline. On homework due dates, I will end lecture 5 minutes early to allow time for you to submit your assignment. Reasonable requests to submit the assignment at an alternate time on or before the due date will be considered, provided that the alternate time is before 4pm on the due date. In such cases, students may be asked to submit their assignment to their TA's mailbox. Absolutely no assignments will be accepted after 4pm on the due date. The only exception is for McBurney students who have 'Flexibility with Deadlines' listed in their accommodation letter. You are welcome (and encouraged) to submit your assignment early to TA during your discussion section, if your discussion section is before the assignment due date. Extensions will not be allowed. However, under exceptional circumstances, an assignment may be excused.

Hard Copies Only: Only hard copies of assignments will be accepted for credit. If you cannot come to campus the day an assignment is due, you should (1) submit the assignment early, or (2) ask a classmate to submit the assignment for you. The only exception is for documented illness. In this case you may submit electronically if it is absolutely necessary (but this is discouraged, as it creates more work for the TA's).

Neatness: Your submitted homework should look pristine, and the grader should have no trouble reading your work. The graders and TA's have been instructed to heavily deduct points for work that has any legibility issues whatsoever. In addition, make sure that:

- Your work is *stapled*. Folding the corner over is not acceptable. Using any sort of clip is also not acceptable. It has to be a staple.
- Your problems are *in order*.
- Your submission does not include "scratch work". Note: This emphatically *does not* mean that you shouldn't show your work. It only means that if it took you multiple attempts to do the problem, you should only include the work that directly leads to the answer you claim is correct.

Heading: Submissions must include the following heading on the upper right corner:

Your name
The course number (MATH 340)
Your TA's name
Your discussion section number and meeting time

This is so that your paper can be easily identified. Since the papers will need to be sorted by TA and section during the grading process, it is *very* important that your submission includes this header.

Collaboration: You are encouraged to discuss the problems with other students, but the work that you submit must be your own, written up without the assistance of anyone else. Handing in plagiarized work, whether copied from a fellow student or off the web, is not acceptable. See the Academic Integrity statement below.

Quizzes: There will be several (between 3 and 5) quizzes during the semester; they will be given during your discussion section.

Exams: NO books, notes, calculators, phones, etc., allowed during exams.

Exam I	Thursday Oct. 10	(during class)	in Van Vleck B130
Exam II	Thursday Nov. 14	(during class)	in Van Vleck B130
Final Exam	Friday Dec. 13	2:45PM–4:45PM	in TBA

All exams will be cumulative.

Attendance and Participation: You are expected to come to class and pay attention. While attendance and participation do not officially contribute to the course grade, I reserve the right to raise the grade of any student whose participation in class significantly enhances the classroom learning environment.

Course Learning Outcomes: Students will be able to

- Solve systems of linear equations.
- Work with matrices.
- Encode a system of linear equations in a matrix.
- Perform row and column operations.
- Put a matrix in echelon and reduced echelon form.
- Perform Gauss-Jordan elimination.
- Compute the determinant of a matrix.
- Compute the determinant via row and column operations.
- Understand the geometric interpretation of the determinant.
- Understand the cofactor expansion and Cramer's rule.
- Determine whether a matrix is singular.
- Compute the inverse of a matrix.
- Work with abstract vector spaces.
- Work with linear transformations, coordinate vectors, and associated matrices.
- Recognize and work with subspaces of a vector space.
- Understand spanning sets and linear independence/dependence.
- Work with bases and understand dimension.
- Understand the rank of a matrix.
- Work with and compute the kernel and image of a linear transformation.
- Work with similarities and changes of basis.
- Compute and work with eigenvalues and eigenvectors.
- Determine when matrices are diagonalizable.
- Recognize symmetric matrices and their properties.
- Work with inner product spaces.
- Be able to encode an inner product using a matrix, and be able to recognize when a matrix is associated to an inner product.
- Be able to carry out the Gram-Schmidt process.
- Understand and apply the Cauchy-Schwarz inequality.

ACADEMIC POLICIES

RULES, RIGHTS & RESPONSIBILITIES To see the Guides Rules, Rights and Responsibilities information, refer to http://guide.wisc.edu/undergraduate/#rulesrightsandresponsibilitiestext.

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/