MTH 362: Linear Algebra

Professor: Dr. Catherine Crawford
Contact Information: DA 209C, 630-617-3479, crawford@elmhurst.edu
Office Hours: Monday 10:00 – 11:30 AM; Tuesday 12:30 – 1:30 PM; Thursday 1:00 – 2:00 PM; or by appointment
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Course Description: This course is an introduction to linear algebra. Topics include systems of linear equations, matrix algebra, determinants, vector spaces, linear transformations, orthogonality, and eigenvalues. The course content combines computation with an increasing emphasis on reading and writing proofs as the course progresses. *Prerequisite*: Math 251 Multivariate Calculus and Math 301 Discrete Math.

Required Text: *Linear Algebra and its Applications,* by Lay, Lay, and McDonald (5th Edition). We will be covering chapters 1-7. Selected topics from other chapters may also be included.

Grading:

Quizzes/Homework/Projects	**100 pts**	Wednesdays; Quizzes *Tentatively*: **9/12, 9/26, 10/24, 11/7, 12/5**
Seminar/Career Night	**20 pts**	Wednesdays 4:00 – 5:00 PM / Career Night TBD
2 Exams (100 pts each)	**200 pts**	*Tentative Dates*: **10/03 & 11/14**
Final Exam (cumulative)	**200 pts**	Date: **Friday 12/14 at 1:00 – 3:00 PM**
	520 pts	

Your final letter grade for the course will be based on the percentage of total points earned. Excessive and consistent disruptions (e.g. tardiness, leaving class for drinks or the restroom, cell phones, etc.) may result in lowering your grade up to one full letter grade. ___All cell phones must be turned completely off and put away___. *Having a cell phone out during an exam or quiz will result in an automatic 0 grade for the exam or quiz.*

EXAMS AND EXAM REPLACEMENT POLICY: You must take all exams in class on the announced dates (*subject to change at my discretion*). **No make-up exams will be allowed.** You will have the option of replacing your lowest exam score will with your final exam percentage (if this is to your benefit), s*o there is no need for make-up tests. You will not be allowed to take an exam early or late for any reason*. If you miss any exam(s), your final percentage will serve as the score for the missed exam(s). Only the missed exam score(s) will be replaced. The final exam score cannot be replaced.

QUIZZES: Quizzes will typically be given during the first 15-20 minutes of class. Additional quizzes may also be given, with advance notice. For every 3 in-class quizzes, I will drop 1.

HOMEWORK: Typically, homework will be assigned each class and (a portion of) it will be **due Wednesday of the next week** unless there is a quiz or exam that week or otherwise noted. Additional homework may be collected, with advance notice. You have a **next *day* by 4pm** grace period on assignments without penalty (unless this option is abused or otherwise noted). You will be docked 10% for each *day* late thereafter. **Late homework will not be accepted after the assignment has been graded.** Homework scores are typically based on solutions to a few of the problems and overall completeness. For every 3 homework assignments graded, I will drop 1.

PROJECTS: Projects may be assigned periodically throughout the semester. You will **not** be allowed to drop any of these project scores.

Any projects and the remaining homework and quiz grades will be scaled to 100 points.

SEMINAR/CAREER NIGHT: As part of your grade, you are **required to attend one of the math seminars** held Wednesdays 4:00-5:00 PM in DA 213 **and Career Night**. For each event you must hand in a 1-2 page Summary/Evaluation Paper. Seminar Summary/Evaluation Papers receive a holistic (overall) grade based on the guidelines below.

Seminar Summary/Evaluation Paper Guidelines:		
Attendance:	• **Attendance and written paper**	**~60%**
Content:	• **Clear summary of the main point(s) and some details of the talk** *[Note: You will often not understand everything in the talk, nor are you expected to. But you should be able to explain the main point(s)/some details clearly (e.g. Imagine trying to explain what you did understand of the talk to another math/science major who was not in attendance.).]* • **Evaluation of the topic** *[Note: The evaluation is not a critique of how well the speaker presented the material, but more about the ideas presented and their potential impact on you and to the broader science or education community. You should also consider any limitations or questions you have about the talk along with possible extensions for further work.]*	**~20%**
Mechanics & Format:	• **1-2 pages, double-spaced, 1-inch margins** • **Clear and skillful organization and writing** • **Error-free** • **Neat and professional presentation**	**~20%**

POLICIES AND ACADEMIC INTEGRITY: You are expected to adhere to the College Academic Integrity Policy as stated in the *E-Book* as it applies to this class. For example, *obtaining or attempting to use unauthorized materials or information or unauthorized help from another person or source is considered __cheating__*.

- Test and quizzes, whether take-home or in-class, are to be your own work unless otherwise stated.
- Calculators and notes are not allowed on quizzes and tests unless otherwise stated. If calculators are allowed, you may not store any notes or unauthorized programs on the calculator.
- Having a cell phone out during an exam or quiz will result in an automatic 0 grade for the exam or quiz.
- **You may work with others on your homework and are __encouraged__ to do so**. But you must turn in your own homework unless specifically stated as group work requiring one submission.
- Individual projects should be your own work. All group members should make quality contributions to group projects.

LEARNING CENTER: ACADEMIC SUPPORT: The Learning Center offers services to support the academic performance of all Elmhurst College students. Sessions are structured to promote principles of self-regulated learning and academic management. Areas of peer tutoring include math, statistics, writing, biology, kinesiology, and psychology. Additionally, assistance with special test preparation (e.g., ACT, SAT, GRE, and TAP) and academic reading/study strategies is available. For more information, contact Emmi McAdams, Tutoring Coordinator, at emmim@elmhurst.edu, 630-617-5376, or Susan Roach, Learning Center Director, at susan.roach@elmhurst.edu, 630-617-3155. The Learning Center is located in the Frick Center, Room 229.

ACCESS AND DISABILITY SERVICES: Elmhurst College will make reasonable accommodations for students with disabilities based on the presentation of appropriate documentation. If you believe that you have a disability that may impact your work in this course, contact Access and Disability Services at disability.services@elmhurst.edu or 630-617-6448. Access and Disability Services is located in the Frick Center, Room 229. *Then please contact me*.

LEARNING OUTCOMES: Upon successful completion of this course, students should be able to:
1. Convert systems of linear equations to vector and matrix equations.
2. Solve linear systems using matrix operations.
3. Understand the characteristics of invertible and non-invertible matrices and their connections to solutions of systems of linear equations.
4. Determine if a set constitutes a vector space or subspace under the operations of addition and scalar multiplication.
5. Find bases for a given vector space.
6. Find the eigenvalues and eigenvectors of a matrix and understand their applications to diagonalization and discrete dynamical systems.