SYLLABUS Spring 2023
The University of Iowa
The College of Liberal Arts and Sciences
Department of Mathematics
Course Title: MATH: 2700:0101 Introduction to Linear Algebra
Time/Days/Location: 12:30P-1:20P MTWTh in 118 MLH (MacLean Hall)

Course ICON site: To access the course site, log into Iowa Courses Online (ICON) https://icon.uiowa.edu/index.shtml using your Hawk ID and password.

Course Home: The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the add and drop deadlines, the “second-grade only” option (SGO), academic misconduct policies, and other undergraduate policies and procedures. Other UI colleges may have different policies.

Instructor: Robert DeYeso III
Office location: 1N in MLH
Office hours: Monday 2-3pm, Wednesday 3-4pm, Thursday 11am-12pm, and by appointment.
E-mail: robert-deyeso@uiowa.edu

DEO (Department Executive Officer) Contact Information: Ryan Kinser, 25F MLH, ryan-kinser@uiowa.edu
Prerequisites: (MATH:1550 or MATH:1850) and (MATH:1560 or MATH:1860)

Some of the policies relating to this course (such as the drop deadline) are governed by its administrative home, the College of Liberal Arts and Sciences, 120 Schaeffer Hall.

Description of Course:

Objectives and Goals of the Course: Upon completion of the course, students will be able to:
1. Obtain the reduced row echelon form of a given matrix and determine uniqueness of solutions associated with its systems. Using this form, find the rank of the given matrix, and bases/dimensions for the range and null spaces.
2. Determine if a given matrix is invertible by either: computing its determinant, appealing to the dimensions of the range or null spaces, or finding uniqueness of solutions.
3. Find the matrix representation of a linear transformation given on a specified basis.
4. Compute the characteristic polynomial of a matrix and determine the eigenvalues of eigenvectors of the matrix using the roots of the obtained polynomial.
5. Identify properties of a symmetric matrix based on its eigenvalues, and their relevance to specific applications.

TEXTBOOK: The ICON Direct program will be used to provide required course materials via your ICON course site.

Your U-Bill will be charged automatically after your course has started unless you opt out prior to the last day for tuition and fee reduction course deadline. Specific opt out information will be provided in the course syllabus and in the opt out tool.

MyLab Math with Pearson eText for Linear Algebra and its Applications (18 Weeks) Required
ISBN: 9780135851203
Author: Lay; Lay; McDonald (6th edition)
Publisher: Pearson©2021
Approximately $62.99 will be billed to your U-Bill.
MATERIAL TO BE COVERED: Lay, Lay, and McDonald. Linear Algebra and its Applications. 6th Edition. Chapters 1, 2, 3, 4, 5, 6, 7.

- Chapter 1: (1.1-1.9) Linear equations and solution sets; row reduction and echelon forms; linear independence; linear transformations and their matrix presentations.
- Chapter 2: (2.1-2.5, 2.8-2.9) Matrix operations, elementary matrices, and inverses; partitioned matrices and the LU factorization; subspaces of $\mathbb{R}^n$, column and null spaces of a matrix; bases and dimension of subspaces; rank of linear transformations. Relevant material in tandem with that from Chapter 4.
- Chapter 3: (3.1-3.3) Determinants and basic properties; Cramer's rule; volumes and determinants.
- Chapter 6: (6.1-6.5) Inner product and orthogonality; Gram-Schmidt process; Least-Squares problems.
- Chapter 5: (5.1-5.7) Introduction to eigenvectors and eigenvalues; the characteristic equation; diagonalizing matrices; applications to differential equations.
- Chapter 7: (7.1-7.4) Symmetric matrices and quadratic forms; singular-value decomposition.

Grading System: Plus/minus grading will be used.

40% 2 Midterms
30% Final Exam
10% Quizzes every two weeks
20% Homework weekly

ALL EXAMS ARE COMPREHENSIVE unless specified otherwise.

Grade Distribution and Ranges: We will use a +/- grading style. CLAS has guidelines for the distribution of specific letter grades, but we may deviate from this based on class performance. Any A+’s are allocated only for exceptional work. The expected ranges (expressed as intervals) for letter grades are

<table>
<thead>
<tr>
<th>Grade</th>
<th>C</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>D+</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>C+</td>
<td>[78,80)</td>
<td>[98,100+]</td>
<td>[92,98)</td>
<td>[88,90)</td>
<td>[82,88)</td>
<td>(80,82)</td>
</tr>
<tr>
<td>C</td>
<td>[72,78)</td>
<td>[98,100+)</td>
<td>[92,98)</td>
<td>[90,92)</td>
<td>[88,90)</td>
<td>[82,88)</td>
</tr>
<tr>
<td>A-</td>
<td>[70,72)</td>
<td>[98,100+)</td>
<td>[92,98)</td>
<td>[90,92)</td>
<td>[88,90)</td>
<td>[82,88)</td>
</tr>
<tr>
<td>A</td>
<td>[68,70)</td>
<td>[98,100+)</td>
<td>[92,98)</td>
<td>[90,92)</td>
<td>[88,90)</td>
<td>[82,88)</td>
</tr>
<tr>
<td>B+</td>
<td>[62,68)</td>
<td>[98,100+)</td>
<td>[92,98)</td>
<td>[90,92)</td>
<td>[88,90)</td>
<td>[82,88)</td>
</tr>
<tr>
<td>B</td>
<td>[60,62)</td>
<td>[98,100+)</td>
<td>[92,98)</td>
<td>[90,92)</td>
<td>[88,90)</td>
<td>[82,88)</td>
</tr>
<tr>
<td>D</td>
<td>[0,60)</td>
<td>[98,100+)</td>
<td>[92,98)</td>
<td>[90,92)</td>
<td>[88,90)</td>
<td>[82,88)</td>
</tr>
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The instructor reserves the right to adjust these ranges if the instructor believes there are reasons to do so.

Midterm Exams:

**MIDTERM 1:** 12:30PM - 1:20PM 02/23/2023 Th 118 MLH

**MIDTERM 2:** 12:30PM - 1:20PM 04/06/2023 Th 118 MLH

Date and Time of the Final Exam

The final examination date and time will be announced by the Registrar generally by the fifth week of classes and it will be announced on the course ICON site once it is known. Do not plan your end of the semester travel plans until the final exam schedule is made public. It is your responsibility to know the date, time, and place of the final exam. According to Registrar's final exam policy, students have a maximum of two weeks after the announced final exam schedule to request a change if an exam conflict exists or if a student has more than two exams in one day (see the policy here). It is the student's responsibility to know the date, time, and place of the final exam.

TENTATIVE TIMETABLE

**Week 1:** Syllabus + Sections 1.1-1.2
**Week 2:** Sections 1.2-1.5
**Week 3:** Sections 1.5-1.7
**Week 4:** Sections 1.8-1.9, -2.1
**Week 5:** Sections 2.1-2.3
**Week 6:** Sections 2.4-2.5
**Mid Term Exam 1:** Chapters 1 and 2 Thursday of the 6th week February 02/23 in 118 MLH
**Week 7:** Sections 2.8-2.9
**Week 8:** Sections 2.9, 3.1-3.2
**Spring Break March 6 - 10**
**Week 9:** Sections 3.2-3.3, skip to 6.1
**Week 10:** Sections 6.2-6.3  
**Week 11:** Sections 6.3-6.4  
**Mid Term Exam 2:** Chapters 2, 3, and 6 Thursday of the 11th week, April 04/06 in 118 MLH  
**Week 12:** Sections 5.1-5.3  
**Week 13:** Sections 5.3-5.4  
**Week 14:** Sections 5.5-7.2  
**Week 15:** Sections 7.2-7.4  
**Final exam will be comprehensive**

**Course Policies:**

**ATTENDANCE AND CLASSROOM EXPECTATIONS**

Students are expected to attend every class. Absences may affect your grade.

All students are expected to attend class and to contribute to its learning environment in part by complying with university policies and directives regarding appropriate classroom behavior or other matters.

**Academic Honesty and Misconduct**

All students in CLAS courses are expected to abide by the [CLAS Code of Academic Honesty](#). Undergraduate academic misconduct must be reported by instructors to CLAS according to these procedures. Graduate academic misconduct must be reported to the Graduate College according to Section F of the [Graduate College Manual](#).

**Rules on Student Collaboration:**

In this class, students are encouraged to discuss homework. However, *all homework submitted must be your own work (or your own group for group assignments). If you collaborate with other students on a problem, you must write all their names on your submitted work next to the specific problem.* Assignment submissions with duplicated work that do not indicate collaboration will be considered the result of academic dishonesty. If you need help, please stop by during my office hours. Students are responsible for understanding this policy; if you have questions, ask for clarification.

**Student Complaints**

Students with a complaint about a grade or a related matter should first discuss the situation with the instructor and/or the course supervisor (if applicable), and finally with the Director or Chair of the school (DEO: Ryan Kinser), department, or program offering the course.

Undergraduate students should contact [CLAS Undergraduate Programs](#) for support when the matter is not resolved at the previous level. Graduate students should contact the CLAS [Associate Dean for Graduate Education and Outreach and Engagement](#) when additional support is needed.

**Drop Deadline for this Course**

You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the [drop deadline for this course](#) here. When you drop a course, a “W” will appear on your transcript. The mark of “W” is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other registration changes can be found on the [Registrar’s website](#). Undergraduate students can find policies on dropping and withdrawing [here](#). Graduate students should adhere to the [academic deadlines](#) and policies set by the Graduate College.

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**College of Liberal Arts and Sciences (CLAS) Course Policies**

**Attendance and Absences**

University regulations require that students be allowed to make up examinations which have been missed due to illness or other unavoidable circumstances. Students with mandatory religious obligations or UI authorized activities must discuss their absences with me as soon as possible. Religious obligations must be communicated within the first three weeks of classes.
**Exam Policies**

**Communication: UI Email**
Students are responsible for all official correspondence sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community.

**University Policies**
- Accommodations for Students with Disabilities
- Basic Needs and Support for Students
- Classroom Expectations
- Exam Make-up Owing to Absence
- Free Speech and Expression
- Mental Health
- Military Service Obligations
- Non-discrimination
- Religious Holy Days
- Sexual Harassment/Misconduct and Supportive Measures
- Sharing of Class Recordings

**Where to Get Help (in addition to office hours):**

- Math Tutorial Lab: [https://math.uiowa.edu/math-tutorial-lab](https://math.uiowa.edu/math-tutorial-lab)
- Engineering Tutoring: [https://engineering.uiowa.edu/current-students/academic-support-and-tutoring/engineering-tutoring](https://engineering.uiowa.edu/current-students/academic-support-and-tutoring/engineering-tutoring)
- Tutor Iowa: [https://tutor.uiowa.edu/](https://tutor.uiowa.edu/)
- Other tutoring resources: [https://math.uiowa.edu/math-tutorial-lab/other-tutoring-resources](https://math.uiowa.edu/math-tutorial-lab/other-tutoring-resources)