

For students

This is a template syllabus. This file contains course specific information, such as catalog description, goals and objectives, which does not change. The parts highlighted in red are to be determined by the individual instructors. The official syllabus for each section will be provided by the instructor in the beginning of the semester.

SYLLABUS Fall 20xx

**The University of Iowa
The College of Liberal Arts and Sciences
Department of Mathematics
Introduction to Linear Algebra, MATH:2700:0xxx
Time and Place**

Prerequisites: MATH 1850 or 1550 or 1860 or 1560.

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.

Instructor:

Office location and hours:

Phone:

E-mail:

Website address:

TA: There is no TA for this course.

Supervisor: For this course, see the DEO.

DEO Contact Information: Professor ..., 14 MLH, 319-335-0714, ...@uiowa.edu

Description of the course:

This course presents the fundamental concepts, methods, and techniques of linear algebra. Topics include the solution of systems of linear equations, matrices, reduction to row echelon form, rank, nullity, determinants, vectors in n -dimensional Euclidean space, general vector spaces, dimension, linear transformations, change of basis, eigenvalues and eigenvectors, diagonalization, symmetric matrices, inner product spaces, Principal Axis Theorem.

Linear algebra is important for two fundamental reasons: (i) Linear equations are essentially the *only* equations that can be solved, especially when more than one variable is involved. A large portion of applied mathematics is devoted to transforming non-linear problems into linear equations that can be solved. (ii) Linear algebra is a gateway to modern mathematics. The key concepts of linear algebra are matrices and matrix algebra. Matrices are used for solutions of linear equations, the study of properties of linear transformations, the description of various vector spaces, etc. In the course, we will discuss the geometry of Euclidean spaces, eigenvalues and eigenvectors, diagonalization of matrices, orthogonal diagonalization of symmetric matrices and many other fundamental notions.

Objectives and goals of the course:

This course introduces students to vectors, linear transformations, and matrices with applications to the geometry of Euclidian n-space and generalizations. The course usually begins with a careful study of the solution of linear systems of equations and ends with the orthogonal diagonalization of symmetric matrices. Topics include row reduction, matrix algebra, determinants, bases, dimension, rank, nullity, eigenvalues, and eigenvectors.

One of the goals is to give the students a good grounding in basic linear algebra. This means giving you the tools to solve systems of linear equations in more than one variable, and giving you what you may need in order to manipulate matrices and linear transformations.

Equally important goal is to show the students logical processes of mathematics, i.e., we will see how good examples lead to important definitions and general statements.

Required text: For Fall 20xx (Check the current textbook from Department Webpage)

<https://math.uiowa.edu/undergraduate-program/course-information/book-list>

The textbook used in 2018: “*Linear Algebra and its applications*”, by David Lay, Steven Lay, J McDonald **fifth edition**. ISBN 978-0-321-98238-4 (3 hole punched loose leaf version 978-0-321-98265-0)

You may also be able to bind a binder version and an e-book version. Check with the bookstore to see what is available. It is important to have the current edition. That way homework assigned will match up with what everyone else is doing.

All are available in the University Bookstore and Iowa Book and Supply; and hard cover by Amazon and many other possibilities for online purchases.

Material to be covered: Chapters 1-7 of the textbook, some sections will be omitted

Tentative timetable:

<u>Weeks</u>	<u>Chapters(sections)</u>	<u>Subject</u>
1-3	1 (1-9)	Linear equations
3-5	2 (1-4, 8, 9)	Matrix algebra
6	3 (1-3)	Determinants
7-10	4 (1-7)	Vector spaces
11-13	5 (1-4)	Eigenvalues and eigenvectors
13-14	6 (1-4)	Orthogonality
15	7 (1, 2)	Symmetric matrices and quadratic forms

Grading:

For each course, the instructor chooses a grading strategy appropriate to departmental and college guidelines, and the related discipline. Some of the recommended options include (but not limited to) the following:

With **criterion-reference grading**, students receive grades based on the quality of their work in relation to the criteria defined by the instructor and by the rubrics or models specifying the qualities of each grade. Some instructors may choose to adjust the scale (criteria) if a need arises.

Norm-based grading is used in the course which is based on how others in the class perform. This method is generally used in large lecture courses or coordinated multi-section courses. The distribution of grades may be based on CLAS recommendations.

Grading System: Plus/minus grading will be used.

XX% X midterms (dates)

XX% Final exam (date, time and place to be announced)

XX% X Quizzes, about every other week (dates)

XX% Homework, assigned weekly, and usually due the following week

XX% Attendance and class participation (optional)

All exams are comprehensive, unless specified otherwise.

A Word about the Date and Time of the Final Exam: The date and time of every final examination is announced by the Registrar generally by the fifth week of the classes. **No exams of any kind are allowed during the last week of classes.** All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. It is the student's responsibility to know the date, time, and place of the final exam.

Course Policies: For Fall 20xx

Students are expected to attend all lectures, and do all of the homework regularly. Students are responsible for everything covered in the lectures, textbook and the prerequisites. Important announcements about changes (if necessary) to the syllabus, homework, exams, etc. will be done in the lectures or they will be e-mailed to your UI e-mail address.

There may be quizzes, depending on the section (excluding the weeks of the exams), consisting of problems similar to those assigned as homework. Taking all quizzes and the three exams (midterms and final) is mandatory. In the exams, you are expected to show all of your work in an organized and coherent fashion. In the long problems, all work must be shown, and giving only a final solution obtained by guessing or using a calculator may not earn full credit. Make-ups may be given for the exams missed due to unavoidable circumstances and compelling reasons which are documented in writing. If you have a conflict or a medical reason, discuss your situation with your lecturer as soon as possible. No late homework without a good excuse. No extra credit homework and no make-ups for homework.

You are strongly encouraged to go to your lecturer's office hours. Make an appointment, if you have a conflict with the listed office hours.

Cell phones must be turned off during the lectures and exams. If you have to read or text a message during the lecture, please do it outside the classroom. During the exams, the cell phones are required to be put (far) away, preferably at the bottom of your backpack. During the exams, you cannot hold them in your hand, not keep them on your desk, chair, or anywhere easily accessible, and you cannot use it as a calculator.

Make-up policy: As stated in CLAS webpage:

<https://clas.uiowa.edu/faculty/student-attendance-and-absences>:

University policy requires that students be permitted to make up examinations missed because of illness, mandatory religious obligations, authorized UI activities, or unavoidable circumstances. An unavoidable circumstance is defined as an event beyond the student's control and often involves a serious

and unexpected hospitalization, a family tragedy, or a related incident. Such circumstances **do not include** attendance at a wedding, a family vacation, obligations related to work or other such matters. The instructor of a student participating in an authorized UI activity is sent a statement generally by email from the UI official in charge of the event before the absence occurs; this statement will include the specific date and time that the student will miss class. Activities related to employment, fraternities or sororities, or volunteer activities are not UI authorized activities.

Other course resources: There is **no TA** for this course and help is not available through the Math Tutorial Lab. You are **strongly encouraged** to go to your lecturer's office hours for additional help as needed. If you have conflicts with the listed office hours, make an appointment for additional office hours.

Student Collaboration: Student collaboration is NOT permitted on exams. Any attempt to collaborate during exams will result in a 0 score on that test. The homework for this course is designed to help you master your knowledge related to the topics covered during lecture. Be sure to test your knowledge by doing the homework on your own. **The instructors will specify if collaboration is allowed on assignments and, if so, the expectations for a student's individual performance.**

Notes to the Students:

1. All students in the College have specific rights and responsibilities. You have the right to adjudication of any complaints you have about classroom activities or instructor actions. Information on these procedures and your responsibilities is available in the Schedule of Courses and on-line in the College's Student Academic Handbook, (<https://clas.uiowa.edu/students/handbook>). In summary, first see the person you wish to complain about, and then see his/her immediate supervisor. The chain is: graduate or undergraduate assistants, then **Prof. XX**, then the Chairman of the Department of Mathematics **Prof. YY**, and then an appropriate Dean. The Department of Mathematics has offices in 14 MLH (MacLean Hall). To make an appointment to talk to the chairman of the department call 335-0714 or contact the departmental secretary in 14 MLH.

2. We would like to hear from anyone who has a disability which may require some modification of seating, testing, or other class requirements so that appropriate arrangements may be made. Please contact your lecturer during his office hours, in the beginning of the semester and far in advance of the exams. You should notify the Office of Student Disability Services, SDS and obtain the form(s) needed. The necessary modifications will be made available to you after the SDS processes and approves your request.

3. We are planning to use ICON for posting grades and other course material. Also, some announcements may be e-mailed through ICON to your UI e-mail. Check ICON and your UI e-mail regularly, and make sure that UI has your correct e-mail address.

4. This course plan may be modified during the semester. All changes will be announced in class in advance. It is solely the student's responsibility to be informed of such announced changes.

CLAS Teaching Policies & Resources — Syllabus Insert

<https://clas.uiowa.edu/faculty/teaching-policies-resources-syllabus-insert>