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.

MATH 2550

SYLLABUS Fall 20xx

The University of Iowa
The College of Liberal Arts and Sciences
Department of Mathematics

Engineering Math III: Matrix Algebra: MATH 2550: xxxx

Time & Location for Lecture: xxxx

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.

Prerequisites: MATH:1850 or MATH:1550 or MATH:1860 or MATH:1560 or MPT Level 3 score of 15 or higher.

Approved GE: None.

Instructor:
Office location and hours:
Phone:
E-mail:
Website address:
TA: None
Supervisor: For this course, see the DEO.
DEO Contact Information: Professor …, 14 MLH, 319-335-0714, …@uiowa.edu

Description of Course:

Applications, computers for matrix calculations; matrix, vector arithmetic; linear independence, basis, subspace (in R2, R3); systems of equations, matrix reduction; rank, dimension; determinants, applications; eigenvalues, eigenvectors; diagonalization, principal axis theorem.

This course is an abbreviated version of MATH:2700. Here the emphasis is placed on matrices rather than on both linear transformations and matrices. Particular topics include operations on matrices, the use of matrix in solving systems of linear equations and evaluating determinants, eigenvalues and eigenvectors, the diagonalization of matrices and an introduction to subspaces of Euclidean space. Grades are based on homework, midterms, and a final exam. Although the course is part of the engineering mathematics sequence, it is not restricted to engineering students. The course is taught by faculty.

Objectives and Goals of the Course:

The objectives of a student taking MATH:2550 are to gain an understanding of basic concepts and techniques of linear algebra and computation with matrices appropriate to an engineering curriculum.

The use of matrices in modeling is ubiquitous in the sciences and engineering. An understanding of the fundamental concepts and techniques of linear algebra involving vectors and matrices is essential to success in engineering. MATH:2550 is a linear algebra course which has been streamlined by placing less emphasis on linear transformations and more emphasis on matrices and matrix calculations. MATH:2550 begins with the study of systems of linear equations and techniques for solving them using matrix row and column operations. Following this, students will learn basic algebra and arithmetic operations of matrices including matrix multiplication, inverses, and the determinant function. Determinants lead to the next topic, eigenvalues and eigenvectors, very important in a variety of ways for engineers. The course finishes with the topic of geometry and orthogonality in vector spaces including a discussion of quadratic forms and symmetric matrices.

Required text: (Check the current textbook from Department Webpage)

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

The textbook used in 2018: ***Linear Algebra & Its Applications*** by Lay, Lay, and McDonald, 5th Edition with MyLab Math Access Card.

Material to be covered: The Chapters are from the text above. The topics will be essentially the same if the textbook changes.

Chapter 1. Linear Equations in Linear Algebra: Systems of Linear Equations, Row Reduction and Echelon Forms, Vector Equations, The Matrix Equation Ax = b, Solution Sets of Linear Systems, Linear Independence
Chapter 2. Matrix Algebra: Matrix Operations, The Inverse of a Matrix, Characterizations of Invertible Matrices, Matrix Factorizations, Subspaces of Rn, Dimension and Rank
Chapter 3. Determinants: Introduction to Determinants, Properties of Determinants, Cramer's Rule, Volume and Linear Transformations
Chapter 5. Eigenvalues and Eigenvectors: Eigenvectors and Eigenvalues, The Characteristic Equation, Diagonalization, Eigenvectors and Linear Transformations

Chapter 6. Orthogonality and Least Squares: Inner Product, Length, and Orthogonality, Orthogonal Sets, Orthogonal Projections, The Gram–Schmidt Process
Chapter 7. Symmetric Matrices and Quadratic Forms: Diagonalization of Symmetric Matrices, Quadratic Forms

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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.

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."

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 instructors will specify if collaboration is allowed on assignments and, if so, the expectations for a student's individual performance.

Other 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 all 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.

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.

Resources for Students:

Math Tutorial Lab: 125 MLH http://www.math.uiowa.edu/math-tutorial-lab
Students will find the Writing Center and the Speaking Center very useful for this course:
Writing Center: http://www.uiowa.edu/~writingc/
Speaking Center: http://clas.uiowa.edu/rhetoric/for-students/speaking-center

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