MATH 35: INTRODUCTION TO LINEAR ALGEBRA

In Workflow

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Approval Path

1. Mon, 14 Oct 2024 15:50:09 GMT
   Vincent Pigno (vincent.pigno): Approved for MATH Committee Chair
2. Mon, 14 Oct 2024 16:35:07 GMT
   Kimberly Elce (kelce): Approved for MATH Chair
3. Thu, 24 Oct 2024 00:51:52 GMT
   Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
4. Thu, 24 Oct 2024 15:24:29 GMT
   Chris Taylor (ctaylor): Approved for NSM Dean

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Changes proposed by: Vincent Pigno (217361639)

Contact(s):

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Catalog Title:
Introduction to Linear Algebra

Class Schedule Title:
Intro To Linear Algebra

Academic Group: (College)
NSM - Natural Sciences & Mathematics

Academic Organization: (Department)
Mathematics & Statistics

Will this course be offered through the College of Continuing Education (CCE)?
No

Catalog Year Effective:
Fall 2025 (2025/2026 Catalog)

Subject Area: (prefix)
MATH - Mathematics

Catalog Number: (course number)
35

Course ID: (For administrative use only.)
147236

Units:
3

Is the ONLY purpose of this change to update the term typically offered or the enforcement of existing requisites at registration?
No

In what term(s) will this course typically be offered?
Fall, Spring

Does this course require a room for its final exam?
Yes, final exam requires a room

This course complies with the credit hour policy:
Yes

Justification for course proposal:
Changing the course prerequisite to Math 31. Math 35 is a course for math majors, it is the first class where they are introduced to some basics of proof writing. In practice, most students take it after having completed Math 31; however some students enroll in Math 35 right after completing Math 30, and we have noticed that they usually face a serious struggle in that class. We have decided to change the prerequisite for this course to make sure that the students enrolled are more mathematically mature and have a stronger chance of succeeding in the class.

Course Description: (Not to exceed 90 words and language should conform to catalog copy.)
Careful development of matrices, systems of equations, determinants, vector spaces, linear transformations, orthogonality, real and complex eigenvalues; R3 viewed as a vector space with generalization to Rn.

Are one or more field trips required with this course?
No

Fee Course?
No

Is this course designated as Service Learning?
No

Is this course designated as Curricular Community Engaged Learning?
No

Does this course require safety training?
No

Does this course require personal protective equipment (PPE)?
No

Does this course have prerequisites?
Yes

Prerequisite:
MATH 31

Prerequisites Enforced at Registration?
Yes

Does this course have corequisites?
No

Graded:
Letter

Approval required for enrollment?
No Approval Required

Course Component(s) and Classification(s):
Discussion

Discussion Classification
CS#04 - Lecture /Recitation (K-factor=1 WTU per unit)
Discussion Units
3

Is this a paired course?
No

Is this course crosslisted?
No

Can this course be repeated for credit?
No

Can the course be taken for credit more than once during the same term?
No

Description of the Expected Learning Outcomes and Assessment Strategies:

List the Expected Learning Outcomes and their accompanying Assessment Strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers). Click the plus sign to add a new row.

	Expected Learning Outcome	Assessment Strategies
1	Solve systems of linear equations using Gaussian elimination, and interpret solution sets.	Homework, classwork, exams
2	Perform arithmetic operations on matrices.	Homework, classwork, exams
3	• Write simple proofs including derivations of properties of arithmetic operations on matrices, linearity of a transformation, linear independence of a set of vectors.	Homework, classwork, exams
4	• Identify invertible matrices and calculate inverses, compute determinants of matrices, and analyze the connection between the determinant and properties of matrices, including invertibility.	Homework, classwork, exams
5	• Apply the definitions of vector space, subspace, spanning set, linearly independent sets, basis, and dimension to problems in R^2 and R^3, and generalize these concepts to abstract vector spaces.	Homework, classwork, exams
6	Compute the kernel and range of a linear transformation and use them to demonstrate various properties of the transformation.	Homework, classwork, exams
7	Determine the matrix representation of a linear transformation.	Homework, classwork, exams

Is this course required in a degree program (major, minor, graduate degree, certificate?)
Yes

Has a corresponding Program Change been submitted to Workflow?
No

Identify the program(s) in which this course is required:

Programs:
BA in Mathematics

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer)?
No

Will there be any departments affected by this proposed course?
No

I/we as the author(s) of this course proposal agree to provide a new or updated accessibility checklist to the Dean's office prior to the semester when this course is taught utilizing the changes proposed here.
I/we agree

University Learning Goals

Undergraduate Learning Goals:
Competence in the disciplines
Intellectual and practical skills
Integrative learning

Is this course required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?
Yes

For the Council for the Preparation of School Personnel (to be filled out with assistance of your department chair):

Does this course change impact your department's currently written Program Standards Document?
No

Common Standards: In what way does this course or program change impact the currently written Common Standards document? Please include any suggested language changes:
na

Is this change in response to program or unit assessment activities?
No

Will this course introduce any new or changes to program assessments?
No

GE Course and GE Goal(s)

Is this a General Education (GE) course or is it being considered for GE?
Yes

In which GE area(s) does this apply?
B4. Mathematical Concepts and Quantitative Reasoning/2. Mathematical Concepts and Quantitative Reasoning

Which GE objective(s) does this course satisfy?
Use mathematical ideas to accomplish a variety of tasks.

Attach Course Syllabus with Detailed Outline of Weekly Topics:
MATH35.pdf

Syllabi must include: GE area outcomes listed verbatim; catalog description of the course; prerequisites, if any; student learning objectives; assignments; texts; reading lists; materials; grading system; exams and other methods of evaluation.

Will more than one section of this course be offered?
No

General Education - Area 2: Mathematical Concepts and Quantitative Reasoning

Section 1.

Indicate in written statements how the course meets the following criteria for Area 2. Relate the statements to the course syllabus and outline. Be as succinct as possible.

General criteria:

Is an introductory or survey course with no college level prerequisites (except for intermediate algebra, which is required).
n/a, already an approved GE course.

Develops basic mathematical or logical concepts, quantitative reasoning skills, and has general applicability in solving problems.
Linear algebra is a core mathematics area with far reaching applications.

(Note: Math 35 is an already approved GE course.)

Develops computational skills or competence in the analysis of arguments.

The development of linear algebra involves both computation skills as well as logical arguments.
(Note: Math 35 is an already approved GE course.)

Specific criteria:

A student will be able to solve problems by thinking logically, making conjectures, and constructing valid mathematical arguments.

Development of abstract thinking and making mathematical arguments is a core feature of linear algebra. Problem solving is a key component of the course.
(Note: Math 35 is an already approved GE course.)

A student will be able to make valid inferences from numerical, graphical and symbolic information.

Development of abstract thinking and making mathematical arguments is a core feature of linear algebra. Problem solving is a key component of the course.
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A student will be able to apply mathematical reasoning to both abstract and applied problems, and to both scientific and non-scientific problems.

Development of abstract thinking and making mathematical arguments is a core feature of linear algebra. Problem solving is a key component of the course.
(Note: Math 35 is an already approved GE course.)

Includes a writing component described on course syllabus

l) If course is lower division, formal and/or informal writing assignments encouraging students to think through course concepts using at least one of the following: periodic lab reports, exams which include essay questions, periodic formal writing assignments, periodic journals, reading logs, other. Writing in lower division courses need not be graded, but must, at a minimum, be evaluated for clarity and proper handling of terms, phrases, and concepts related to the course.

2) If course is upper division, a minimum of 1500 words of formal, graded writing. [Preferably there should be more than one formal writing assignment and each writing assignment (e.g. periodic lab reports, exams which include essay questions, a research/term paper etc.) should be due in stages throughout the semester to allow the writer to revise after receiving feedback from the instructor. Include an indication of how writing is to be evaluated and entered into course grade determination.]

Mathematical writing is developed in this course as a transition to upper division mathematics.
(Note: Math 35 is an already approved GE course.)

Section 2

If you would like, you may provide further information that might help the G.E. Course Review Committee understand how this course meets these criteria and/or the G.E. Program Objectives found in the CSUS Policy Manual, General Education Program, Section I.B.

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Key: 3230