MAS 3105 Applied Linear Algebra I - FSU

MAS 3105-0001—Applied Linear Algebra I, Fall 2013

INSTRUCTOR: Dr. Ettore Aldrovandi http://www.math.fsu.edu/~ealdrov
OFFICE: 215 LOV.
EMAIL: aldrovandi@math.fsu.edu
OFFICE HOURS: Announced on the Blackboard Site and the instructor's web page.

COURSE WEBSITE Under the courses tab at blackboard (http://campus.fsu.edu).

CLASS SCHEDULE Class will meet on Monday, 8:00 AM–8:50 AM, Tuesday and Thursday, 8:00 AM–9:15 AM in MCH 0201.

PREREQUISITES Calculus w/ Analytical Geometry II (MAC2312 or equivalent) with a C- or better.

TEXT Linear Algebra and its applications by David Lay, 4th Edition, Addison-Wesley (ISBN:0321385179)

COURSE CONTENT A selection of topics from chapters 1–6 of the text, with a few additional items from chapter 7, if possible. The course will cover basic elements of linear algebra from both theoretical and computational perspectives. The material includes the study of systems of linear equations, linear transformations, matrix algebra, eigenvalues, eigenvectors and inner-product spaces.

COURSE OBJECTIVES Linear algebra provides fundamental methods and tools for modeling and analyzing data in a vast array of problems arising in the sciences and engineering. The main goal of the course is to introduce students to the theoretical and computational components of the discipline, emphasizing the applicability of the methods and techniques discussed. The key algebraic notions in linear algebra have geometric counterparts that allow us to visualize various concepts, so both aspects of the subject will be explored. The interplay between geometry and algebra leads to a deeper understanding of the concepts discussed and opens new perspectives. Data mining, image analysis, and computer graphics are some examples of modern applications where the methodology of linear algebra has played an important role.

GRADING Your grades will be based on the average score of weekly quizzes, three tests, and a final exam, each counting 20% of the overall grade. One quiz will be dropped when computing the overall quiz score.

Letter grades will be determined from numerical grades as follows. A: 90-100%; B: 80-89%; C: 70-79%; D: 60- 69%; F: 0-59%. Plus or minus grades may be assigned in a manner consistent with standard University practice. This includes factors such as class attendance and participation.

Partial credit will be awarded only when part of a solution is completely correct. Students with incomplete assignments at the end of the course will be given the earned final grade. A grade of I will not be given to avoid a grade of F or to give additional study time. Failure to process a course drop will result in a course grade of F.

WEEKLY QUIZZES Each Thursday, at the end of class, except on a test week: there will be no quiz on a test week.

TEST EXAMS There will be **three** test exams.

1. Thursday, Sep. 19th
2. Thursday, Oct. 17th
3. Thursday, Nov. 14th

FINAL EXAM Monday, Dec. 9th, ~~7:30–9:30 AM,~~ 10:00–12:00 noon, same location as class meetings.

The final exam will be cumulative, with emphasis on the material not covered by the midterms.

EXAM POLICY No makeups. An absence may be excused given sufficient evidence of extenuating circumstances and in accordance with the University policy stated below. In such a case, extra weight will be attached to the other exams. Barring emergencies, the matters leading to a possible excused absence should be discussed with the instructor well in advance. An unexcused absence will result in a grade of zero.

HOMEWORK Homework problems will be assigned but **not** collected for grading. Homework problems will be posted on the course web site and/or announced in class. In any case, assignments only are a suggestion, and you should attempt as many problems as possible. Students are expected to work out problems as part of their study routine. An effort will be made to discuss problems in class, in order to illustrate the material.

COURSE ATTENDANCE Students are expected to attend class regularly. A student absent from class bears the full responsibility for all subject matter and information discussed in class. Attendance (and participation) will be useful to make decisions in borderline cases.

Other situations are discussed under "University Attendance Policy" below.

TUTORING FOR MATH Tutoring is available for this course via ACE Tutoring at the Learning Studio in the William Johnston Building. Appointments may be made, and drop-ins are welcome for one-on-one and group tutoring. Please contact the ACE Learning Studio at tutor@fsu.edu, 850-645-9151, or find more information at http://ace.fsu.edu/tutoring.

University Attendance Policy Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor Policy The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to "... be honest and truthful and... [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at http://fda.fsu.edu/Academics/Academic-Honor-Policy.)

Americans With Disabilities Act Students with disabilities needing academic accommodation should: (1) register with and provide documentation to the Student Disability Resource Center; and (2) bring a letter to the instructor indicating the need for accommodation and what type. This should be done during the first week of class.

This syllabus and other class materials are available in alternative format upon request.

For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center
874 Traditions Way
108 Student Services Building
Florida State University
Tallahassee, FL 32306-4167
(850) 644-9566 (voice)
(850) 644-8504 (TDD)
sdrc@admin.fsu.edu
http://www.disabilitycenter.fsu.edu/

MAS 3105 Course Syllabus
Course ID stephens47247
twitter: #famumas3105

Course Number	Course Title	Credits	Clock Hours Per Week
MAS 3105	Linear Algebra	3	Lecture: 3 Laboratory: 0 Demonstration: 0

Department: Mathematics	**Prerequisites:** MAC 2312
College: Science and Tech	

Required Textbook: Custom MAS 3105 Linear Algebra and a CourseCompass access code

Faculty Name: Desmond Stephens	**Term and Year:** Fall 2013
Office Location: Jackson Davis, 107	**Campus Telephone:** 412-5238 **Email:** desmond.stephens@famu.edu **Twitter:** #famumas3105

Office hours:	Monday	Tuesday	Wednesday	Thursday	Friday
	10 - 12		7:30 - 8, 10-11	11:15 - 12	

Grading

Student performance will be evaluated in the following areas:

Quizzes/Homework/Projects	30%
In Class Assignments	20%
Examinations	30%
Comprehensive Final Exam **(The final exam is mandatory)**	20%

*** If an emergency occurs on test day, you must call the day of the test to arrange for final exam as your make-up. This will only be granted when proper documentation is provided. If for some reason you have a legitimate excuse to miss a given test, you **must take the test before** the actual test is administered. **There are no individual make-up tests.**

Student grades will be determined solely on the basis of class averages using the following grading scale

A	90 – 100
B	80 – 89
C	70 – 79
D	60 –69
F	59 ↓

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Student Learning Outcomes

(1) Students will be able to define fundamental linear algebra terms, be able to explain basic theorems and demonstrate the ability to perform basic linear algebra operations.
- sketch 2 - and 3 - dimensional vectors (ch. 4)
- add, subtract and scalar multiplication of vectors (ch. 1)
- add, subtract and multiply matrices (ch. 2)
- partition, transpose and find inverses of matrices (ch. 2)
- write a system of equations as a vector and matrix equation (ch 1)
- reduce matrices to row echelon and reduced row echelon forms (ch. 1)
- solve systems of equations using Gaussian elimination (ch. 2)
- find the inverse of a matrix using Gauss-Jordan elimination (ch. 2)
- determine if a function is a linear transformation
- find the kernel (null space) and range of a linear transformation (ch. 3 & 4)
- find the rank of a matrix (ch. 2)
- calculate the determinant of a matrix (ch. 3)
- find eigenvalues and eigenvectors of a matrix
- perform Gram Schmidt process to construct an orthonormal basis

(2) Students will categorize groups of elements as sets, vector spaces and subspaces.
- define a vector space using its 10 properties (ch. 2 & 4)
- define a subspace using the closure properties for addition and scalar multiplication (ch. 2 & 4)
- determine if a set of vectors form a vector space
- determine if a subset of a vector space satisfies the three properties of a subspace

(3) Students will apply the theory of linear algebra to other areas of mathematics, science and engineering.
- students will balance chemical equations
- students will determine flow through networks
- students will solve systems of ordinary systems of differential equations

(4) Students will be able to articulate the relevance of linear algebra to their field of study.
- students will construct a 250 word written justification for linear algebra in their major field of study.

(5) Students will construct proofs of linear algebra concepts and theorems by developing logical mathematical arguments.

- students will be able to distinguish between axioms, definitions and theorems
- students will construct proofs by first stating what is given and what must be proven
- students will construct proofs using the 10 axioms of vector spaces
- students will use theorems, definitions and axioms to prove theorems related to:
  - uniqueness of the inverse of an n x n matrix
  - products and inverses of transposes
  - span
  - linear independence/dependence

(6) Students will synthesize linear algebra concepts into oral and written presentations using internet tools and standard presentation software such as PowerPoint, Keynote and Prezi.
- students will use internet tools to create tutorials
- students will create oral presentations on course materials

Attendance

Class attendance is mandatory for all students. No unexcused absences will be accepted. A legitimate cause is defined as absence from class due to
   a) **participation in a required university activity,**
   b) **personal or family illness,**
   c) **other conditions over which the student has no control** .
In each instance, however, the proper authority must give written verification before I will excuse the absence. In every case, students will be required to complete all assigned coursework which was missed during the excused period of absence in order to remain in good standing in the course. Each student is strongly encouraged to read the University policy on attendance as printed in the catalog.

"I" Grades and Grade Changes

The student should review the University policy on withdrawals, attendance , and "I" grades. An "I" grade has a very specific and!restricted meaning. In particular, a student who is failing the course and does not take the Final Examination is not eligible for an "I" grade. No "I" grades will be issued in these situations. In addition students that have not earned a grade they like are not allowed to have grades changed to reflect work done after the semester is over.

Technology

A graphing calculator that performs matrix operations is highly recommend ed. Students may also find Wolfram Alpha (http://www.wolframalpha.com/) useful. Throughout the semester you will also be given assignments that may require using computer software and search engines. You will find computers in the computer lab located in Jackson Davis Hall Room 106.

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Cell Phones

All cellular telephones must be turned **off** (or on silent mode) unless otherwise instructed. If a **cell phone is heard** during class, the student will be asked to **leave** the classroom, **not to return** that day. Any assignment missed will be considered unexcused and a grade of zero will be assigne d.

Blackboard, CourseCompass, Twitter and Email

All students are required to obtain a **FAMU** email address. In addition each student must be enroll on CourseCompass by the **end of the first week of classes**. **You must check your email, CourseCompass account and the Twitter hashtag (#famumas3105) at least once daily after 5PM to be sure you are kept abreast of course activities and assignments**.

Course Topics

Chapter 1	LINEAR EQUATIONS IN LINEAR ALG
Chapter 2	MATRIX ALGEBRA
Chapter 4	VECTOR SPACES
Chapter 5	EIGENVALUES AND EIGENVECTORS
Chapter 6	ORTHOGONALITY AND LEAST SQU.

Due Dates

Homework and project due dates along with test dates will be posted and/or announced in class.

Important Dates

Last day to withdraw	November 8, 2013
Thanksgiving	November 28-29, 2013
Last day of classes	December 6, 2013
Final Exam Week	December 9 - 13, 2013