WICHITA STATE UNIVERSITY

31060, Math 511 Linear Algebra, Summer 2017

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Preferred Method of Contact:	In Person
Office Hours:	11:00am-12:00pm Monday to Thursday or by appointment
Classroom; Days/Time:	103 Lindquist Hall, 9:50am-10:50am, Daily
Prerequisites:	Math 243 with a grade point of 2.00 or better

How to use this syllabus

This syllabus provides you with information specific to this course, and it also provides information about important university policies. This document should be viewed as a course overview; it is not a contract and is subject to change as the semester evolves.

Course Description

An elementary study of linear algebra, including an examination of linear transformations and matrices over finite dimensional vector space. Prerequisites: Math 243 with a grade point of 2.00 or better.

Required Texts/Readings Textbook

Linear Algebra with Applications by Steven J. Leon, Ninth Edition, Published by Prentice Hall.

Measurable Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- Apply row operations of matrices to solve linear systems and calculate the value of a determinant.

- Analyze the structure of a finite dimensional vector space.

- Verify, represent and use linear transformations in appropriate setting.

- Apply matrices in calculation

- Analyze the structure of inner product space.

- Apply eigenvalues and eigenvectors to solve system of differential equations.

Learning Outcome For Chapter One: Student will (a) perform the row and column operations for a matrix. (b) solve linear systems by reducing the augmented matrix to reduced echelon form. (c) do basic algebraic operations on matrices. (d) analyze the relation between row operations and elementary matrix multiplication. (e) do algebraic operations on partitioned matrices.

Learning Outcome For Chapter Two: Student will (a) compute a determinant by row or column operations. (b) analyze the basic properties of determinants. (c) use Cramer's rule to solve a linear system. (d) use the determinant to check if a square matrix is non-singular.

Learning Outcome For Chapter Three: Student will (a) verify if a set with an addition and scalar multiplication is a vector space. (b) verify if a subset of a vector space is subspace. (c) verify if a set of vectors are linearly dependent or independent. (d) find a basis and dimension of a vector space. (e) find the transition matrix from one basis to another. (f) find the coordinate vector of a vector relative to a basis and change the coordinates under different bases. (g) find a basis and the dimension for the row space, column space and null space of a matrix.

Learning Outcome For Chapter Four: Student will (a) verify if a mapping is a linear transformation, (b) represent a linear transform with respect to different choices of basis in the domain space and image space. (c) analyze the relationship between the matrices representing the same linear transformation under different bases.

Learning Outcome For Chapter Five: Student will (a) analyze the basic properties of scalar products in n dimensional space, use scalar product to find out when two vectors are orthogonal, and calculate the vector projection of one vector onto another.(b) verify when two subspace are orthogonal and analyze the orthogonal relation between the null space, the rang of a matrix and the range of the transpose of a matrix. (c) solve a least square problem. (d) analyze the structure and properties of an inner product space and a normed space.(e) analyze the properties of orthonormal sets and orthogonal matrices. (f) use the Gram-Schmidt process to find an orthonormal sets from a set of linearly independent vectors.

Learning Outcome For Chapter Six: Student will (a) find eigenvalues and eigenvectors of a square matrix. (b) analyze the structure of solution space of a system of linear first order homogeneous differential equations and solve a system of first order linear homogeneous differential equations with constant coefficients when the coefficient matrix has enough linearly independent eigenvectors. (c) diagonalize a square matrix and use the process to solve a system of first order linear differential equations with constant coefficients.

Academic Honesty

Students are responsible for knowing and following the Student Code of Conduct `http://webs.wichita.edu/inaudit/ch8_05.htm` and the Student Academic Honesty policy `http://webs.wichita.edu/inaudit/ch2_17.htm`.
A standard of academic honesty, fairly applied to all students, is essential to a learning environment. Consequences of violating the honesty policy include possible grade reduction, failing grade for the semester, or dismissal from the college.

Class Protocol

Students are expected to attend class and be on time. Students are expected to bring all necessary course materials with them. In most instances, this included the textbook, paper, pencil/pen, completed homework. If an absence is anticipated, the student will contact the instructor via e-mail or phone call PRIOR to the absence, if at all possible. Positive participation is expected. Mistakes are to be expected, respected, inspected, and corrected. Respect will be shown at all times. (Instructor/student and student/student). Should you find it necessary to make or take a phone call or text, please step outside the classroom to do so.

Grading Scale

Homework: Total homework for the semester is worth 100 points. At the end of the semester, for every student, the two homeworks with lowest points will be dropped. Missing and/or late homework will be scored zero. Then the points of the rest of homework will be added up and divided the sum by the total maximum points (that is the score one will get if one gets maximum points in each of the homework after dropping two), and then the ratio is multiplied by 100.

Chapter Tests: Each chapter test is worth 100 points. Thus the maximum points that one can get for chapter tests is 300.

Final Exam: The Final Exam is worth 100 points.

Your course score will be calculated in terms of the formula:
    Course Points = homework (100) + chapter tests (300) + final exam (100)

Then your course grade will be determined according to what percentage of points that you get throughout the semester. (Percentage number will be rounded up to get two digits)
WSU uses a +/− grading scale for final grades and to calculate grade point averages. In this class, grades are assigned according to the following chart.

Points/percentages, as instructor chooses	Letter grade	Grade Points	Interpretation
92 or above	A	4.00	*The A range denotes excellent performance.*
90 to 91	A−	3.70	
88 to 89	B+	3.30	
82 to 87	B	3.00	*The B range denotes good performance.*
80 to 81	B-	2.70	
78 to 79	C+	2.30	
72 to 77	C	2.00	*The C range denotes satisfactory*
68 to 71	C-	1.70	
66 to 67	D+	1.30	
64 to 65	D	1.00	*The D range denotes unsatisfactory*
60 to 63	D-	0.70	
59 or below	F	0.00	*F denotes failing performance.*

Assignments

A due homework assignment will be collected at the beginning of the class on the due date. A few selected homework problems will be graded. Homework scores are based solely on the problems graded. NO LATE homework will be accepted. However when a student's grade is calculated the two homeworks with lowest scores will be dropped. (Missing homework will be scored zero). Details to solutions to homework problems must be provided. No credit will be given to a homework problems if only a simple answer is written down (unless the problem is very, very simple).

HW #1
Section 1.1 5(c), 6(e).
Section 1.2 6, 9, 15.
Section 1.3 1, 2, 4(c).
Due: 06/09

HW #2
Section 1.4 9, 12, 19.
Section 1.5 9, 10 (b)(d)(f)(h), 12(a)(c).
Section 1.6 1, 4(a), 5(a), 8.
Due: 06/15

HW #3
Section 2.1 3(f), 3(g), 5.
Section 2.2 3(e), 4, 12.
Section 2.3 2(c).
Due: None

The First Test: 06/16. It covers Chapters 1 and 2.

HW #4
Section 3.1 3, 4, 13.
Section 3.2 1, 3, 4(d), 5, 11(d), 11(e), 12 (d), 12(e), 13, 19(a), 19(c).
Due: 06/23

HW #5
Section 3.3 2(c), 2(d), 2(e). 4(c), 7, 8(a), 8(c), 9(d) .
Section 3.4 5, 7, 14(b).
Section 3.5 6, 9.
Due: 06/30

HW #6
Section 3.6 (page 159) 1(b), 4(d), 6, 10.
Section 4.1 6, 8, 10, 11, 17.
Section 4.2 2(a), 4(a), 7, 15.
Due: 07/06

Hw #7
Section 4.3 2, 4, 6, 7.
Due: None

The Second Test: 07/07. It covers chapters 3 and 4.

Hw #8

     Section 5.1 1(d), 3(d), 5, 11.
     Section 5.2 1(d), 2, 3, 6.
     Due: 07/14

Hw #9

     Section 5.3 1(c), 5(a).
     Section 5.4 3, 7(b), 9, 13.
     Section 5.5 4, 6, 8, 21.
     Section 5.6 5, 8.
     Due: 07/21

Hw #10

     Section 6.1 1(i), 2, 16.
     Section 6.2 1(e), 2(b).
     Section 6.3 1(c), 1(e), 32(a).
     Due: None

The Third Test: 07/26. It covers Chapters 5 and 6.

The Final Exam: 07/28. It covers Chapters 1 to 6.

Extra Credit

There will be no extra credit work.

Late Assignments

Late assigments will not be accepted.

Missed Exams

Make-up examinations (tests) are given only if a student has a good reason and obtains permission directly from the instructor. A telephone message left on voice mail (answering machine in my office or a message taken by a secretary in the department) will not be considered as permission to take a make-up examination.

Important Academic Dates

For Summer Semester 2017, classes begin on June 5, 2017, and end on July 28, 2017. The last date to drop a class and receive a W (withdrawn) instead of F (failed) is July 11, 2017. There are no classes on July 4, 2017.

Definition of a Credit Hour

Success in this 3 credit hour course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction and preparation/studying or course related activities for a total of 135 hours.

Disabilities

If you have a physical, psychiatric/emotional, or learning disability that may impact on your ability to carry out assigned course work, I encourage you to contact the Office of Disability Services (DS). The office is located in Grace Wilkie Annex, room 150, (316) 978-3309 (voice/tty) (316-854-3032 videophone). DS will review your concerns and determine, with you, what academic accommodations are necessary and appropriate for you. All information and documentation of your disability is confidential and will not be released by DS without your written permission.

Counseling & Testing

The WSU Counseling & Testing Center provides professional counseling services to students, faculty and staff; administers tests and offers test preparation workshops; and presents programs on topics promoting personal and professional growth. Services are low cost and confidential. They are located in room 320 of Grace Wilkie Hall, and their phone number is (316)

978-3440. The Counseling & Testing Center is open on all days that the University is officially open. If you have a mental health emergency during the times that the Counseling & Testing Center is not open, please call COMCARE Crisis Services at (316) 660-7500.

Diversity and Inclusive

Wichita State University is committed to being an inclusive campus that reflects the evolving diversity of society. To further this goal, WSU does not discriminate in its programs and activities on the basis of race, religion, color, national origin, gender, age, sexual orientation, gender identity, gender expression, marital status, political affiliation, status as a veteran, genetic information or disability. The following person has been designated to handle inquiries regarding nondiscrimination policies: Executive Director, Office of Equal Opportunity, Wichita State University, 1845 Fairmount, Wichita KS 67260-0138; telephone (316) 978-3186.

Intellectual Property

Wichita State University students are subject to Board of Regents and University policies (see http://webs.wichita.edu/inaudit/ch9_10.htm) regarding intellectual property rights. Any questions regarding these rights and any disputes that arise under these policies will be resolved by the President of the University, or the Presidents designee, and such decision will constitute the final decision.

Shocker Alert System

Get the emergency information you need instantly and effortlessly! With the Shocker Alert System, we will contact you by email the moment there is an emergency or weather alert that affects the campus. Sign up at www.wichita.edu/alert.

Student Health Services

WSUs Student Health clinic is located in 209 Ahlberg Hall. Hours are 8:00am to 7:00pm (8:00 am to 5:00 pm on Fridays), though the clinic may be closed occasionally on Wednesdays from noon to 1:30pm. The telephone number is (316) 978-3620. In addition to outpatient and preventive care (including immunizations, a prescription service, and testing/counseling for sexually transmitted infections), Student Health can handle minor injuries. All services are confidential. For more information see www.wichita.edu/studenthealth.

Title IX

Title IX of the Educational Amendments of 1972 prohibits discrimination based on sex in any educational institution that receives federal funding. Wichita State University does not tolerate sex discrimination of any kind including: sexual misconduct; sexual harassment; relationship/sexual violence and stalking. These incidents may interfere with or limit an individuals ability to benefit from or participate in the Universitys educational programs or activities. Students are asked to immediately report incidents to the University Police Department, (316) 978-3450 or the Title IX Coordinator (316) 978-5177. Students may also report incidents to an instructor, faculty or staff member, who are required by law to notify the Title IX Coordinator. If a student wishes to keep the information confidential, the student may speak with staff members of the Counseling and Testing Center (316) 978-3440 or Student Health Services (316)978-3620. For more information about Title IX, go to: http://www.wichita.edu/thisis/home/?u=titleixf

The Heskett Center and Campus Recreation

Whether you are wanting to be active on campus, relieve the stress from classes or take care of your body, Wichita State Campus Recreation is the place for you. Campus Recreation, located inside the Heskett Center, contributes to the health, education, and development of Wichita State University students, faculty, staff, alumni, and community members by offering quality programs and services. With many programs and facilities which are free to all students and members, Campus Recreation offers its members limitless opportunities. For more information about our services see www.wichita.edu/heskett.

Video and Audio Recording

Video and audio recording of lectures and review sessions without the consent of the instructor is prohibited. Unless explicit permission is obtained from the instructor, recordings of lectures may not be modified and must not be transferred or transmitted to any other person, whether or not that individual is enrolled in the course.

Tentative Schedule for Continuous 8 week Session

Week	Topics, Readings, Assignments, Deadlines
1	Linear Systems, Row Echelon Forms, Matrix Arithmetic, Matrix Algebra, Elementary Matrices HW 1 Due 06/09
2	Partitioned Matrices, Determinants, Cramer's Rule HW 2 Due 06/15 Exam 1 on 06/16
3	Vector Space, Subspace, Linear Independence HW 4 Due 06/23
4	Basis, Dimension, Change of Basis, Row and Column Space, Linear Transformations HW 5 Due 06/30
5	Matrix Representation of Linear Transformations, Similarity No School 07/04 HW 6 Due 07/06 Exam 2 on 07/07
6	Scalar Products, Orthogonal Subspaces, Least Squares Problems, Inner Product Spaces, Orthonomal Sets HW 8 Due 07/14
7	Gram-Schmidt Orthogonalization, Eigenvalues, Eigenvectors, System of Linear DiffEq HW 9 Due 07/21
8	Diagonalization Exam 3 07/26 Final Exam 07/29