MATH 300: Linear Algebra

Spring 2013 Section 001 3 Credit Hours

Instructor:	Kristen Abernathy
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Course Time and Location:
MWF 12:30-1:50 p.m., Owens 103

Office Hours:
MW 11:00-12:00
R 1:30-2:30
F 2:00-3:00
Other times may be arranged by appointment.

The instructor reserves the right to make modifications to this syllabus. Students will be notified in class and by email.

Student Learning Objectives – Mathematics Department

1. Students apply fundamental mathematical concepts and techniques to solve problems and evaluate results.
2. Students demonstrate the ability to apply appropriate technologies to the study of mathematics and effectively use such technologies to investigate and develop an understanding of mathematical ideas.

Student Learning Objectives – Linear Algebra

1. Students demonstrate an understanding of and competence with the basic ideas of linear algebra including concepts of linearity, theory of matrices, linear transformations, eigenvalues, eigenvectors and diagonalization.
2. Students will investigate applications of linear algebra, develop the ability to work with advanced technology tools within the study of course concepts, and apply reasoning and communication skills to elementary proofs.

For purposes of departmental assessment of student learning in this course, sections of the final exam will be tabulated for all students and cover the objectives listed above. In addition, the common technology rubric will be implemented to evaluate students' ability to implement the use of *Mathematica* and other technology as appropriate for course assignments.

Text, Materials and Learning Aids

- Required Text: *Linear Algebra and its Applications* by David C. Lay. Fourth Edition. Boston: Addison-Wesley, 2012.
- A Study Guide which comes bundled with this text is suggested, but is not required for the course.
- The ability to use *Mathematica* is a prerequisite skill for this course.

Determination of Grade

Homework Assignments (20%)

At the end of each class session, a homework assignment will be made. You are expected to complete the assignment and the instructor will grade selected problems from each assignment. Late work will not be graded unless prior arrangements have been made with the instructor. Each homework assignment will be given a grade out of a possible 20 points. At the close of the semester, these homework grades will be averaged and converted to a 100-point scale.

Tests (60%) There will be three in-class tests as listed on the attached schedule. You are expected to take the tests and the final exam at the scheduled time. Make-up tests are not given. An unexcused absence will result in the grade of zero for any missed test. Excused absences from tests will be dealt with at the end of the term and may depend on individual circumstances. Anticipated absences should be reported and verified in advance; emergency absences must be verified within one week after returning to class. Any questions concerning grading of tests must also be resolved within one week after the tests are returned.

Final Exam (20%) The cumulative final exam is scheduled for Friday, March 22nd, 2013, 12:30 PM.

Letter Grade Determination:

92-100 A	90-91.99 A-	87-89.99 B+	82-86.99 B	80-81.99 B-	77-79.99 C+
72-76.99 C	70-71.99 C-	67-69.99 D+	62-66.99 D	60-61.99 D-	<60 F

Attendance Policy

Attendance at all scheduled class meetings is strongly encouraged. Your number of absences will not be counted, and will not be used directly to determine your grade. However, attendance is mandatory for those class sessions which include a test. If no prior arrangements are made with the instructor, a zero will be recorded for a test not taken due to absence.

Equal Access to Education

Winthrop University is dedicated to providing access to education. If you have a disability and require specific accommodations to complete this course, contact the Office of Disability Services (ODS) at 323-3290. Once you have your official notice of accommodations from the Office of Disability Services, please inform me as early as possible in the semester.

Academic Integrity

Review the student code of conduct for university polices on academic misconduct. Academic misconduct will not be tolerated and will result in a failing grade on the assignment and/or in the course. The full handbook is available online at http://www2.winthrop.edu/studentaffairs/handbook/StudentHandbook.pdf.

Electronic Devices

All electronic devices (including cell phones) other than a calculator should be on silent and kept in your book bag or purse throughout class time unless otherwise instructed. NOTE: if you have some educational, health, or physical reason for an electronic device you must notify your instructor of this accommodation.

Tentative Course Schedule

Date		Section	Topic
M	1/7	1.1	Systems of Linear Equations
W	1/9	1.2	Row Reduction and Echelon Forms
F	1/11	1.3	Vector Equations
M	1/14	1.4	The Matrix Equation A**x**=**b**
W	1/16	1.5	Solution Sets of Linear Systems
F	1/18	1.6	Applications of Linear Systems
W	1/23	1.7	Linear Independence
F	1/25	1.8, 1.9	Introduction to Linear Transformations; The Matrix of a Linear Transformation
M	1/28		**Test 1 (Sims 114)**
W	1/30	2.1	Matrix Operations
F	2/1	2.2, 2.3	The Inverse of a Matrix; Characterizations of Invertible Matrices
M	2/4	2.4, 2.5	Partitioned Matrices; Matrix Factorizations
W	2/6	2.6	The Leontief Input-Output Model
F	2/8	2.7	Applications to Computer Graphics
M	2/11	2.8, 2.9	Subspaces of $\mathbf{R}^n$; Dimension and Rank
W	2/13	3.1, 3.2	Introduction to Determinants; Properties of Determinants
F	2/15	3.3	Volume and Linear Transformations
M	2/18		**Test 2 (Sims 114)**
W	2/20	5.1, 5.2	Eigenvalues and Eigenvectors; The Characteristic Equation
F	2/22	5.3, 5.4	Diagonalization; Eigenvectors and Linear Transformations
M	2/25	5.5	Complex Eigenvalues
W	2/27	5.6	Discrete Dynamical Systems
F	3/1	6.1	Inner Product, Length, and Orthogonality
M	3/4	6.2	Orthogonal Sets
W	3/6	6.3	Orthogonal Projections
F	3/8		**Test 3 (Sims 114)**
M	3/18	6.4	The Gram-Schmidt Process
W	3/20		Review and Evaluation
F	3/22		Final Exam

SU Deadline: R 1/17
Spring Break: M 3/11 to F 3/15
Course Withdraw Date: W 3/20
Final Exam: F 3/22 12:30 p.m. (Sims 114)

MATH 300: Linear Algebra
Assigned Homework Exercises

Text: *Linear Algebra and its Applications* by David C. Lay. Fourth Edition. Boston: Addison-Wesley, 2012.

Section	Exercises
1.1	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 29, 31
1.2	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27
1.3	1, 3, 5, 7, 9, 11, 13, 15, 17, 21, 23, 25, 27, 29
1.4	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 29, 31, 33, 37, 39
1.5	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 27, 29, 31, 33, 35
1.6	1, 3, 5, 7, 9, 11, 13, 15
1.7	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 27, 29, 31, 33, 35, 37, 39
1.8	1, 3, 5, 7, 9, 11, 17, 19, 21, 37, 39
1.9	1, 3, 5, 7, 9, 11, 15, 17, 19, 23, 25, 27, 31, 35, 37, 39
2.1	1, 3, 5, 7, 9, 15, 17, 19, 21, 23, 25, 27, 37, 39
2.2	1, 3, 5, 7, 9, 13, 17, 21, 23, 29, 31
2.3	1, 3, 5, 7, 9, 11, 17, 19, 21, 23, 25, 27, 29, 31
2.4	1, 3, 5, 7, 11, 13, 15, 21
2.5	1, 3, 5, 7, 9, 11, 13, 15, 17
2.6	1, 3, 5, 7, 9, 13
2.7	1, 3, 5, 7, 15, 17, 19
2.8	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37
2.9	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29
3.1	1, 3, 5, 7, 9, 11, 13, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39
3.2	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 31, 33, 35, 37, 39
3.3	19, 21, 23, 25, 27, 29
5.1	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 37, 39
5.2	1, 3, 5, 7, 9, 11, 13, 15, 17, 21
5.3	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35
5.4	11, 13, 15, 17, 19, 21, 25, 31
5.5	1, 5, 7, 11, 13, 15, 17, 19, 21, 23
5.6	1, 3, 5, 7, 9, 11, 13, 15, 17
6.1	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 23, 27, 29
6.2	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 27, 29
6.3	1, 3, 5, 7, 9, 11, 13, 15, 17, 21
6.4	1, 3, 5, 7, 9, 11, 13, 15, 17, 25