COURSE SYLLABUS

YEAR COURSE OFFERED:  2018

SEMESTER COURSE OFFERED:  Spring

DEPARTMENT:  Mathematics

COURSE NUMBER:  2331

NAME OF COURSE:  Linear Algebra

NAME OF INSTRUCTOR:  Vladimir Yushutin

The information contained in this class syllabus is subject to change without notice. Students are expected to be aware of any additional course policies presented by the instructor during the course.

Major Assignments/Exams

Final Exam: 30%
Test 1 and 2: 20% each
Homework: 10%
Quizzes: 20%

Required Reading

Linear Algebra and Its Applications (4th Edition), David C. Lay

List of discussion/lecture topics

(1) Linear Equations in Linear Algebra

1.1 Systems of Linear Equations
1.2 Row Reduction and Solution Sets of Linear Systems
1.3 Vector Equations
1.4 The Matrix Equation Ax =b
1.5 Solutions Sets of Linear Systems
1.7 Linear Independence
1.8 Introduction to Linear Transformations
1.9 The Matrix of a Linear Transformation
(2) Matrix Algebra

2.1 Matrix Operations
2.2-3 The Inverse of a Matrix and Characterizations of Invertibility
2.4 Partitioned Matrices
2.8 Subspaces of $\mathbb{R}^n$
2.9 Dimension and Rank

(3) Determinants

3.2 Properties of Determinants, the Determinant and Invertibility
3.3 Cramer's Rule, Volume, and Linear Transformations
*Permutation Matrices (not in text)

(4) Vector Spaces

4.1 Vector Spaces and Subspaces
4.2 Null Spaces, Column Spaces, and Linear Transformations
4.3 Linearly Independent Sets; Bases
*4.4 Coordinate Systems
4.5 The Dimension of Vector Space
4.6 Rank
*4.7 Change of Basis
*4.9 Applications to Markov Chains

(5) Eigenvalues and Eigenvectors

5.1 Eigenvalues and Eigenvectors
5.2 The Characteristic Equation
5.3 Diagonalization
*5.4 Eigenvectors and Linear Transformations
*5.5 Complex Eigenvalues
*5.6-8 Applications

(6) Orthogonality and Symmetric Matrices

6.1 Inner Product, Length, and Orthogonality
6.3 Orthogonality and Projections
6.4 The Gram-Schmidt Process
6.5 Least-Squares Problems

(7) Symmetric Matrices and Quadratic Forms

*7.1 Diagonalization of Symmetric Matrices
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*7.2 Quadratic Forms
*7.3 The Singular Value Decomposition

* Sections are optional, as time permits