

# Syllabus for Math 304

## Linear Algebra

### Fall 2013

Sections 501–502

**Instructor:** Volodymyr Nekrashevych

**Office:** Milner 223

**Office hours:** Office hours: Monday 1:00–2:00 PM and Wednesday 2:00–3:00 PM or by appointment.

**e-mail:** [nekrash@math.tamu.edu](mailto:nekrash@math.tamu.edu)

**Home-page:** <http://www.math.tamu.edu/~nekrash>

**Class hours:**

Section 501: MWF 9:10–10:00am BLOC 160

Section 502: MWF 10:20–11:10am BLOC 160

**MATH 304 web page:** The web page of the course is

<http://www.math.tamu.edu/~nekrash/teaching/13F/M304.html>

**Text.** Leon, “Linear Algebra with Applications”, 8th Edition, Prentice Hall, ISBN 9780136009290.

**Topics covered.** Introductory course in linear algebra covering abstract ideas of vector space and linear transformation as well as models and applications of these concepts, such as systems of linear equations, matrices and determinants. MATH 323 designed to be a more demanding version of this course. **Prerequisites.** MATH 152; junior or senior classification.

**Grading.** Your grade will be determined by homework, two midterm exams and a *cumulative* final exam. The weights of each of these are as follows.

|             | Homework | Exam I   | Exam II | Final Exam      | Total |
|-------------|----------|----------|---------|-----------------|-------|
|             | 20 pt    | 25 pt    | 25 pt   | 30 pt           | 100   |
| Section 501 | weekly   | Sept. 25 | Oct. 28 | Dec. 9, 8–10am  |       |
| Section 502 | weekly   | Sept. 25 | Oct. 28 | Dec. 10, 8–10am |       |

I may curve any grade and will then compute the course grade by the following rule: *A* for at least 90 points, *B* for at least 80 points, *C* for at least 70 points, *D* for at least 60 points and *F* for less than 60 points.

## Plan of lectures.

- 8/26** 1.1. Systems of linear equations.
- 8/28** 1.1. Matrix of a system. Elementary row operations.
- 8/30** 1.2. Row echelon form. Gaussian elimination.
- 9/2** 1.2. Row echelon form.
- 9/4** 1.3. Matrix algebra
- 9/6** 1.3. Matrix multiplication, its properties.
- 9/9** 1.4. Elementary matrices.
- 9/11** 2.1. Determinant of a matrix.
- 9/13** 2.1. Determinant of a matrix. 2.2. Properties of determinants.
- 9/16** 2.2. Properties of determinants. Computing determinants using Gaussian elimination.
- 9/18** 3.1. Vector spaces. Definitions and examples.
- 9/20** 3.1. Vector spaces. Definitions and examples.
- 9/23** Overview.
- 9/25** First midterm exam.
- 9/27** 3.2. Subspaces.
- 9/30** 3.3. Linear independence.
- 10/2** 3.3. Linear independence. Spaces of functions.
- 10/4** 3.4. Basis and dimension.
- 10/7** 3.4. Change of basis.
- 10/9** 3.4. Change of basis. Transition matrix.
- 10/11** 3.5. Row space and column space. Applications to systems of linear equations.
- 10/14** 3.5. Row space and column space. Applications to systems of linear equations.

**10/16** 4.1. Linear transformations. Definitions and examples.  
**10/18** 4.1. Linear transformations. Definitions and examples.  
**10/21** 4.2. Matrix representations of linear transformations.  
**10/23** 4.2. Matrix representations of linear transformations.  
**10/25** Overview.  
**10/28** Second midterm exam.  
**10/30** 4.3. Similarity, changes of basis for a linear transformation.  
**11/1** 5.1. Orthogonality. The scalar product in  $R^n$ .  
**11/4** 5.4. Inner product spaces.  
**11/6** 5.5. Orthonormal sets  
**11/8** 5.6. The Gram-Schmidt orthogonalization process.  
**11/11** 6.1. Eigenvalues and eigenvectors.  
**11/13** 6.1. Eigenvalues and eigenvectors.  
**11/15** 6.3. Diagonalization.  
**11/18** 6.3. Diagonalization.  
**11/20** 6.3. Exponent of a matrix.  
**11/22** 5.7. Orthogonal polynomials.  
**11/25** 5.5. Trigonometric polynomials. Fourier transform.  
**11/27** Overview.  
**12/2** Overview.

**Make-up policy:** Make-ups for missed quizzes and exams will only be allowed for a university approved excuse in writing. Wherever possible, students should inform the instructor before an exam or quiz is missed. Consistent with University Student Rules , students are required to notify an instructor by the end of the next working day after missing an exam or quiz. Otherwise, they forfeit their rights to a make-up.

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Remember the Aggie Code of Honor: *“An Aggie does not lie, cheat, or steal or tolerate those who do.”*

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