

MATH 304, Section 505

Linear Algebra

Spring 2011

Instructor: Yaroslav Vorobets

Time: TR 11:10 a.m. – 12:25 p.m.

Location: *Milner 216* (moved from BLOC 111!)

Web page: <http://www.math.tamu.edu/~yvorobet/MATH304/>

Office: Milner 004 (phone: 845–0849, e-mail: yvorobet@math.tamu.edu)

Office hours: Wednesday 9:00–11:00 a.m., Thursday 10:00–11:00 a.m., and by appointment

Text: Steven J. Leon, *Linear Algebra with Applications*, 8th ed., Pearson Prentice Hall, Upper Saddle River, NJ, 2009 (<http://www.pearsonhighered.com/leon/>).

Prerequisite: MATH 152 (in particular, being familiar with analytic geometry and vectors).

Course content: This is an introductory course in linear algebra covering the abstract concepts of vector space and linear transformation as well as some models and applications of these concepts to problems in the real world. Topics to be covered include: systems of linear equations, matrices, determinants, vector spaces, linear transformations, orthogonality, eigenvalues and eigenvectors.

Grading system: There will be 2 in-class tests and the final comprehensive exam. The tests are worth 90 points (or 22.5% of the final grade) each, the final exam is worth 100 points (or 25% of the final grade). Extra credit can be earned by solving bonus problems. Also, there will be homework assignments which will account for another 120 points (or 30% of the final grade). The final grades will be assigned according to the 90–80–70–60% scale, that is, A for 360+ pts, B for 320–359 pts, C for 280–319 pts, D for 240–279 pts, and F for less than 240 pts.

The *tentative* dates for the two tests are March 3 and April 12. The final exam is scheduled for Friday, May 6, 3:00–5:00 p.m.

I will assign and collect homework about once per week. Late homework will be accepted only for legitimate reasons and may be penalized if circumstances warrant.

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

Academic integrity: Although students are encouraged to discuss homework problems, each student is expected to write his/her own solutions. Copying another student's work is dishonest and academically worthless. Information about the Honor Council Rules and Procedures can be found at <http://aggiehonor.tamu.edu/>

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Students with disabilities: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Room B118 of Cain Hall or call 845–1637. For additional information, visit <http://disability.tamu.edu/>

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Course outline

Part I (≈ 3 weeks): *Elementary linear algebra*

- Systems of linear equations
- Gaussian elimination, Gauss-Jordan reduction
- Matrices, matrix algebra
- Determinants

Leon's book: Chapters 1–2

Part II (≈ 4.5 weeks): *Abstract linear algebra*

- Vector spaces
- Linear independence
- Basis and dimension
- Coordinates, change of basis
- Linear transformations

Leon's book: Chapters 3–4

Part III (≈ 4 weeks): *Advanced linear algebra*

- Orthogonality
- Inner products and norms
- The Gram-Schmidt orthogonalization process
- Eigenvalues and eigenvectors
- Diagonalization

Leon's book: Sections 5.1–5.6, 6.1, 6.3

Part IV (≈ 2 weeks): *Topics in applied linear algebra*

- Matrix exponentials
- Rotations in space
- Orthogonal polynomials
- Fourier series

Leon's book: Chapters 5–6 (selected sections)