

# Aktosun, Spring 2017, Math 3319

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**Course:** Differential Equations and Linear Algebra, Math 3319, Section 003, Course number 22282

**Office Hours:** 4:30-5:20 pm, Tuesday and Thursday, and by appointment

**Classroom:** PKH 107

**Classtime:** 5:30-6:50 pm Tuesday and Thursday

**Textbook:** Stephen Goode and Scott Annin, Differential Equations and Linear Algebra, 3rd ed., Pearson, 2007.

**Coverage:** The following sections in the textbook:

- 1.1: How differential equations arise
- 1.2: Basic ideas and terminology
- 1.4: Separable differential equations
- 1.6: First-order linear differential equations
- 1.8: Change of variables
- 1.9: Exact differential equations
- 2.1: Matrices: definitions and notations
- 2.2: Matrix algebra
- 2.3: Terminology for systems of linear equations
- 2.4: Elementary row operations
- 2.5: Gaussian elimination
- 2.6: Inverse of a square matrix
- 3.1: Definition of the determinant
- 3.2: Properties of determinants
- 3.3: Cofactor expansions
- 4.1: Vectors in  $\mathbf{R}^n$
- 4.2: Definition of a vector space
- 4.3: Subspaces
- 4.4: Spanning sets
- 4.5: Linear dependence and linear independence
- 4.6: Bases and dimensions
- 5.1: Definition of a linear transformation
- 5.6: Eigenvalue/eigenvector problem
- 5.9: Matrix exponential function
- 6.1: General theory of linear differential equations
- 6.2: Constant-coefficient homogeneous linear differential equations
- 6.3: Method of undetermined coefficients
- 7.8: Matrix exponential and systems of differential equations

**Grading:** Letter grades will be assigned based on the three exam grades, with the lowest exam score contributing 20% and the other two exam scores each contributing 40% to the course grade.

**Exams:** Exam 1: February 16; Exam 2: April 6; Exam 3: May 9.

**Prerequisites:** A grade of C or better in Math 2326 or concurrent enrollment.

**Practice problems:**

- 1.1:** 1, 3, 5, 7, 9, 11
- 1.2:** 1, 3, 5, 7, 9, 11, 13, 17, 19, 21, 25, 27, 31, 35, 37, 39
- 1.4:** 1, 3, 5, 7, 15
- 1.6:** 1, 3, 5, 7, 9, 15, 17
- 1.8:** 1, 3, 5, 7, 9, 11, 13, 15
- 1.9:** 1, 3, 5, 7, 11, 13, 15
- 2.1:** 1, 3, 5, 9, 11, 13, 15, 17, 19, 23, 27
- 2.2:** 1, 3, 7, 9, 11, 13, 15, 17, 19, 27, 31, 33, 37, 39, 43
- 2.3:** 1, 3, 7, 9, 11, 13, 15, 17
- 2.4:** 1, 3, 5, 9, 11, 15, 19, 21, 25
- 2.5:** 1, 3, 5, 7, 13, 17, 21, 33, 37
- 2.6:** 1, 3, 7, 9, 11, 15
- 3.1:** 9, 11, 13, 17, 19, 21
- 3.2:** 1, 3, 9, 15, 19, 21, 23, 25, 27, 29, 37, 39
- 3.3:** 1, 3, 5, 7, 9, 11, 15, 41
- 4.1:** 1, 3
- 4.2:** 1, 3, 5, 7, 9, 11
- 4.3:** 3, 5, 7, 9, 11, 13, 17, 19, 21
- 4.4:** 1, 3, 5, 7, 11, 13, 17, 21, 23, 25
- 4.5:** 1, 3, 5, 7, 13, 15, 19, 21, 29, 31
- 4.6:** 3, 5, 7, 13, 15, 17, 21, 23
- 5.1:** 1, 3, 5, 7, 9, 11, 13
- 5.6:** 1, 3, 9, 11, 13, 15, 17, 21, 23, 25
- 5.9:** 1, 3, 5, 7, 9
- 6.1:** 1, 3, 17, 21, 23, 27, 31, 33, 35, 37
- 6.2:** 5, 7, 9, 13, 17, 19, 21, 23, 29, 31, 33
- 6.3:** 17, 19, 31
- 7.8:** 1, 3, 5, 7