Mathematics 30650-01, Differential Equations

Fall Semester, 2018

MWF 10:30-11:20 am, Hayes-Healy 231

Instructor: Mei-Chi Shaw
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TEXTBOOK: Elementary Differential Equations and Boundary Value Problems by Boyce, di Prima and Meade, 11th Edition (John Wiley and Sons Inc.)
  (ISBN: 978-1-119-37575-3)

Prerequisite: Math 20580

HOMEWORK: The homework of each week will be due on Friday. At the end of the semester the homework with the lowest score will be dropped. **No late homework will be accepted.**

EXAMS:

Exam I: September 27, Thursday, 8:00-9:15 am, 118 Nieuwland Science

Exam II: November 13, Tuesday, 8:00-9:15 am, 118 Nieuwland Science

Final Exam: December 10, Monday, 1:45-3:45 pm

GRADING: Your course grade will be computed as follows:
  Each Exam: 20%
  Homework: 20%
  Final Exam: 40%

Honor Code: The exams are under the honor code. The honor code does not apply to homework. So you may discuss the homework with other classmates but do not copy each other.

Office Hours: There will be regular office hours every Wednesday, 12:00-2:00 pm (or by appointments).

Absence from Exams: A student who is absent from an examination without an official excuse shall receive a grade of zero for that examination. A student who is officially excused will not be penalized. If you miss a test for any reason, call the instructor or the Mathematics Department as soon as possible.

MATH 30650 SYLLABUS

CHAPTER 4 Higher Order Linear Equations (5 Lectures with review of Chapter 3)

4.1 General Theory of nth Order Linear Equations
4.2 Homogeneous Equations with constant Coefficients
4.3 (3.5) The Method of Undetermined Coefficients
4.4 (3.6) The Method of Variation of Parameters

CHAPTER 6 The Laplace Transform (7 Lectures, 1 Review)

6.1 Definition of the Laplace Transform
6.2 Solution of Initial Value Problems
6.3 Step Functions
6.4 Differential Equations with Discontinuous Forcing Functions
6.5 Impulse Functions
6.6 The Convolution Integral

CHAPTER 7 Systems of First Order Linear Equations (10 Lectures)

7.1 Introduction
7.2 Review of Matrices
7.3 Systems of Linear Algebraic Equations
7.4 Basic Theory of Systems of First Order Linear Equations
7.5 Homogeneous Linear Systems with Constant Coefficients
7.6 complex Eigenvalues
7.7 Fundamental Matrices
7.8 Repeated Eigenvalues
7.9 Nonhomogeneous Linear Systems

CHAPTER 8 Numerical Methods (1 Lecture)

8.1 The Euler or Tangent Line Method

CHAPTER 9 Nonlinear Differential Equations and Stability (8 Lectures, 1 Review)

9.1 The Phase Plane: Linear systems
9.2 Autonomous Systems and Stability
9.3 Almost Linear systems
9.5 Predator-Prey Equations

CHAPTER 10 Partial Differential Equations and Fourier Series (7 Lectures, 1 Review)

10.1 Two-Point Boundary Value Problems
10.2 Fourier Series
10.3 The Fourier Convergence Theorem
10.4 Even and Odd Functions
10.5 Separation of Variables, Heat Conduction Problems
10.6 Other Heat Conduction Problems