

Math 2415 Section 0010 – Summer 2017  
Ordinary and Partial Differential Equations

**Instructor:**

Nathan Broaddus

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**Phone:** 614-292-0605

**Office Hours:** MW 1:20pm-2:10pm in MW 650

**Meeting times and locations:**

Section 0010 MWF 11:40PM-1:15PM in Journalism Building (JR) 274

**Course webpage:**

<https://people.math.osu.edu/broaddus.9/2415>

**Textbook:**

W. Boyce and R. C. DiPrima, *Elementary Differential Equations and Boundary Value Problems*,  
**10th edition**, Wiley 2012. ISBN-13: 978-0470458310 (Hardcover or eBook) or 978-1118157381  
(Binder Version)

**About this course:**

Welcome to Math 2415! This course is an introduction to modeling with and solving ordinary and partial differential equations.

**What you should get out of this course:**

During the course of this semester we will cover the following topics:

- 1.1 Some Basic Mathematical Models and Direction Fields
- 1.3 Classification of Differential Equations
- 1.2 Solutions to Some Differential Equations
- 2.2 Separable Equations
- 2.1 Linear Equations with Variable Coefficients
- 2.3 Modeling with First Order Differential Equations
- 2.4 Difference Between Linear and Nonlinear Equations
- 2.5 Autonomous Equations and Population Dynamics
- 3.1 Homogeneous Equations with Constant Coefficients
- 3.3 Complex Roots of the Characteristic Equation
- 3.4 Repeated Roots
- 3.2 Solutions of Linear Homogeneous Equations; The Wronskian
- 3.4 Reduction of Order
- 3.5 Non-homogeneous Equations; Method of Undetermined Coefficients
- 3.7 Mechanical and Electrical Vibrations
- 3.8 Forced Vibrations

10.1 Two-point Boundary Value Problem

10.2 Fourier Series

10.3 The Fourier Convergence Theorem

10.4 Even and Odd Functions

10.5 Separation of Variables; Heat Conduction in a Rod

10.7 Wave Equation: Vibrations of an Elastic String

7.1 Introduction To Linear Systems of First Order PDEs

7.3 Systems of Linear Algebraic Equations; Linear Independence, Eigenvalues, Eigenvectors

7.5 Homogeneous Linear Systems with Constant Coefficients

7.6 Complex Eigenvalues

7.4 Basic Theory of Systems of 1st Order Linear Equations

### **Grading:**

Your grade will be computed using the follows weights:

- 40% Final exam – 11:40am-1:15pm Friday, July 28
- 20% Midterm 1 – Friday, June 30
- 20% Midterm 2 – Friday, July 14
- 20% Homework

Your grades will be recorded on Carmen and your final grade will be curved. Consequently, it is impossible to give *a priori* a precise course-total-to-letter-grade correspondence. **There is no extra credit** in this course.

### **Homework:**

Homework will be announced on the website (<https://people.math.osu.edu/broadus.9/2415>) and is **due at the beginning of class. No late homework will be accepted!** If you cannot make it to class be sure to make arrangements for a classmate to hand in your homework for you. Your lowest homework grade will be dropped. It is your responsibility to check the website daily to make sure that you do not miss a homework assignment. Homework must be submitted in person. **No electronic submission will be accepted** except in the case of a documented emergency and in those cases only print-ready formats (pdfs or docs) are acceptable.

### **Working Together:**

You are encouraged to work together on homework assignments. In fact it is a very good idea to find someone a classmate to work with on a regular basis. However, you should write up your homework solutions separately.

### **Help:**

If you are having trouble in the class you can

1. ask lots of questions in class (this is my favorite option)
2. come to my office hours (MW 1:20pm-2:10pm in MW 650)
3. make an appointment with me for another time

Don't let yourself fall behind. This class moves very quickly.

**Calculators and other electronic devices:**

Smart phones, tablets, computers, calculators, and other electronic computation devices are not allowed during midterm and final exams. You are encouraged to do further research on your homework online, but you should not consult online solution sets for this course for homework that you have not handed in or hope to have graded in the future.

## **Disability Statement:**

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12th Avenue.