Math 2233 - Differential Equations
Syllabus - Fall 2018

Instructor:	Dr. Birne Binegar 430 Mathematical Sciences Tel. 744-5793 Email: birne.binegarokstate.edu Homepage: www.math.okstate.edu/~binegar/courses.html
Lecture Times	9:00–10:15 T,Th, CLB 301
Office Hours:	Mondays 2:00–3:00 , 430 MSCS Wednesday 2:00–3:00pm , 430 MSCS Fridays 12:30–1:30pm , MLSC Room 5 (5^{th} floor of Edmon Low Library)
Text:	*Fundamentals of Differential Equations*, 9th Edition, by R.K. Nagle, E.B. Saff and A.D. Snider, 2018, ISBN 9780321977069
Prerequisites:	Calculus II
Course Objectives:	Upon completing this course, students should understand the general theory of differential equations and the basic techniques for solving differential equations/boundary value problems involving one unknown function and one independent variable.
Homework:	Homework problem sets will be handed out about once a week and your solutions will typically be due the following week. The MLSC (Mathematics Learning Success Center) has tutors on staff who can help you with the homework assignments. The MLSC is located on the 5th floor of the Edmond Low Research Library.
Examinations:	There will be two midterm examinations worth 100 pts each and one final examination worth 150 pts.

Grades: Grades will be determined exclusively from homework, midterm, and final exam scores.

2 Midterm Examinations	200 possible pts.
Homework and Quizes	25 possible pts.
Final Examination	150 possible pts.
	375 possible pts.

The final exam will be held Tuesday, December 11, 2018 8:00–9:50 in 301 CLB.
Letter grades will be assigned as follows:

A:	337	-	375 pts.
B:	300	-	336 pts.
C:	262	-	299 pts.
D:	225	-	261 pts.
F:	0	-	224 pts.

Math 2233
Course Outline

I: Introduction

- Differential Equations: Solutions and Classification

II: First Order Differential Equations - Approximate Methods

- Graphical Methods
- Numerical Methods

III: First Order Differential Equations - Exact Solutions

- First Order ODEs; General Theory
- Separation of Variables
- First Order Linear ODEs
- Constants of Integration and Initial Conditions
- Exact Equations
- First Order ODEs in Applications

IV: Second Order Linear Ordinary Differential Equations

- Second Order Linear ODEs; General Theory
- Homogeneous Equations
  - Superposition Principle
  - The Wronskian and the Form of General Solution
  - Reduction of Order
  - Second Order Linear Equations with Constant Coefficients
    - The Euler Formula and Complex Exponential Functions
    - Mass/Spring Systems
  - Euler-type Equations
- Non-homogeneous Equations
  - Form of the General Solution
  - Variation of Parameters
  - Method of Undetermined Coefficients

V: Laplace Transforms

- The Laplace Transform: Definition and Properties
- Inverse Laplace Transforms
- Laplace Transform and Initial Value Problems
- Laplace Transforms of Discontinuous Functions

VI: Series Solutions of Second Order Linear ODEs

- Review of Taylor Series and Power Series
- Manipulating Power Series
- Power Series Solutions
- Singular Points and Convergence of Series Solutions