Math 2233 - Differential Equations
Syllabus - Fall 2018

Instructor: Dr. Birne Binegar
430 Mathematical Sciences
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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 (5th floor of Edmon Low Library)


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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
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<tbody>
<tr>
<td>A</td>
<td>337 - 375 pts.</td>
</tr>
<tr>
<td>B</td>
<td>300 - 336 pts.</td>
</tr>
<tr>
<td>C</td>
<td>262 - 299 pts.</td>
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<tr>
<td>D</td>
<td>225 - 261 pts.</td>
</tr>
<tr>
<td>F</td>
<td>0 - 224 pts.</td>
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The final exam will be held Tuesday, December 11, 2018 8:00–9:50 in 301 CLB.
Letter grades will be assigned as follows:
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