

Campbellsville University  
MTH 311-01  
Differential Equations

TEXTBOOK: Fundamentals of Differential Equations 8<sup>th</sup> ed. by Nagel, Saff, and Snider

INSTRUCTOR: Chris Bullock

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OFFICE HOURS: MWF 11-12, 1-2 and TR 11-12:15 or by appointment

1. DESCRIPTION OF COURSE: Included in this course is an historic perspective on Differential Equations, differential equations of the first order, applications, singular solutions, linear equations with constant coefficients, miscellaneous methods for equations of higher order, integration in series, and total differential equations. Prerequisite: C or better in MTH 310.
2. STUDENT LEARNING OBJECTIVES: As a result of completing this course, Students will be able to formulate differential equations to model real-life situations which arise from diverse circumstances. (Mathematics program goal 3). In addition, students will be able to use several methods to solve differential equations. (Mathematics program goal 1). By the end of the course, students will have developed an appreciation for the various applications of differential equations; particularly in scientific fields. Students' achievements of these goals will be assessed by homework and exams.
3. COURSE OUTLINE: Topics to be covered include:
  - Chapter 1: Introduction (Definition and examples of differential equations, solutions and initial value problems, direction fields)
  - Chapter 2: First-Order DE's (Separable equations, Linear Equations, Exact equations, Integrating factors, Substitutions and Transformations)
  - Chapter 3: Mathematical Modeling and Numerical Methods (Compartmental Analysis, Heating and Cooling of buildings, Newtonian mechanics)
  - Chapter 4: Linear Second-Order Equations (Mass-spring oscillation, Homogeneous equations, Auxiliary equations with complex roots, Nonhomogeneous equations: Method of undetermined coefficients, Variation of parameters)
  - Chapter 5: Systems (Interconnected fluid tanks, Coupled mass-spring systems)
  - Chapter 6: Higher-Order Linear DE's (Homogeneous equations, Variation of parameters)
  - Chapter 7: Laplace Transforms (Definition, Properties of the Laplace transform, Inverse Laplace transform, Solutions of DE's using the Laplace Transform)

4. **EVALUATION:** There will be a total of four tests including a final exam. Each test will be worth 100 points. Also, there will be a homework grade worth 100 points. Thus, there will be a total of 500 attainable points in this class. The grading scale will be as follows:

90-100% A  
80-89% B  
70-79% C  
60-69% D  
0-59% F

Homework will be assigned and graded after almost every class meeting. The percentage of earned points out of the total points will be recorded for each assignment. At the end of the semester, these homework grades will be averaged to get the final 100-point homework grade. This grade will then be averaged with the four test grades to obtain the final grade for the class.

5. **REQUIREMENTS:** The tentative dates for the exams are as follows:

Exam #1: Feb 16

Exam #2: Mar 10

Exam #3: Apr 14

Final: Thursday, May 12 from 11-12:30

These dates are the planned dates for the exams, but these dates are subject to change depending upon weather and other unpredictable factors.

6. **BOOKLIST:** Fundamentals of Differential Equations 8<sup>th</sup> ed. by Nagel, Saff, and Snider (required)

7. **ATTENDANCE:** Campbellsville University has an attendance policy which states that a student who misses two weeks worth of a class (for any reason) receives a warning. Thus, any student missing 4 class periods in this class will receive a warning. Any student who misses four weeks worth of a class (for any reason) is automatically withdrawn from the class with a failing grade. Thus, any student missing 8 class periods in this class will be withdrawn from the class. PLEASE NOTE THAT, BY THIS POLICY, ANY ABSENCE COUNTS, WHETHER EXCUSED OR UNEXCUSED.

Attendance will be recorded by me every class period at the beginning of class. If you are late for class, you will be counted as absent. Also, if you leave class early, leave your seat, disrupt class, or distract anyone else in class by talking, you will be counted absent. The actions above show disrespect for others in class and thus will be penalized as noted.

You must notify me in advance if you are going to miss a test. You may contact me by phone or by e-mail. Make-up exams are possible if I am notified in advance and if I think the excuse is reasonable.

8. **DISABILITIES:** Campbellsville University is committed to reasonable accommodations for students who have documented physical and learning

disabilities, as well as medical and emotional conditions. If you have a documented disability or condition of this nature, you may be eligible for disability services. Documentation must be from a licensed professional and current in terms of assessment. Please contact the Coordinator of Disability Services at 270-789-5192 to inquire about services.

If you have a documented disability, you must provide the instructor with the paper from Disability Services. At that time, the instructor will give you a copy of the mathematics department disability guidelines.

9. EMERGENCY PHONE NUMBERS:  
Security Cell Phone: 270-403-3611

10. TITLE IX STATEMENT:

Campbellsville University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires all responsible employees, which includes faculty members, to report incidents of sexual misconduct shared by students to the University's Title IX Coordinator.

Title IX Coordinator:

Terry VanMeter  
1 University Drive  
UPO Box 944  
Administration Office 8A  
Phone – 270-789-5016  
Email – [twvanmeter@campbellsville.edu](mailto:twvanmeter@campbellsville.edu)

Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at: [www.campbellsville.edu/titleIX](http://www.campbellsville.edu/titleIX)