

# MATH 242: SECTION 005 - SPRING 2019

## ELEMENTARY DIFFERENTIAL EQUATIONS

Lecture: T, Th 1:15pm - 2:30pm LeConte 405  
Office Hours: T 11:30am - 1:00pm Th 2:30pm - 4:00pm (or by appointment) LeConte 400K

**Instructor:** Duncan Wright  
**Office:** LeConte 400K  
**Email:** dw7@email.sc.edu  
**Website:** <http://people.math.sc.edu/dw7/>

**Course Description:** The lectures will be used for covering new material and introducing interesting applications of the material. The student is expected to read the section to be covered in the lecture prior to the lecture. The instructor will present new and additional material, answer questions, give activities and work examples. Homework will be assigned to each lecture. There will be 8-10 quizzes in the course covering the homework problems assigned. There will be three midterm exams and a cumulative final exam.

**Learning Outcomes:** A student who successfully completes the course should develop as an independent learner and problem solver with the ability to approach problems from a conceptual viewpoint, to utilize more than one idea in a single problem, and to apply appropriate calculus skills to problems in context. The successful student will master concepts and gain skills needed to solve problems related to initial value problems and their particular and general solutions, integrating factors, substitution, variation of parameters, undetermined coefficients, Laplace transform, approximations and will be able to apply these to differential equations to solve mixture, cooling, mechanical vibrations or electrical circuit problems.

**Prerequisites:** Qualification through placement or a grade of C or better in math 241.

**Calculators:** Will not be allowed for tests or quizzes.

**Text:** *Differential Equations: Computing and Modeling*, by C. Henry Edwards and David E. Penney, 5th edition, Pearson, ISBN 978-0-321-81624-2, 2015.

### Important Dates:

January 14th	Classes Begin
January 21st	Martin Luther King, Jr. Day (no classes)
January 22nd	Last Day to Drop Without a W
February 17th	Spring Graduation Application Deadline
March 4th	Last Day to Drop Without a WF and Midpoint in Semester
March 10th-17th	Spring Break (no classes)
April 25th	Last Day of Class
May 7th	Final Exam - 4:00pm

## Grade Distribution:

Homework	10%
Participation	15%
Quizzes	25%
Midterm Exam I	10%
Midterm Exam II	10%
Midterm Exam III	10%
Final Exam	20%

## Letter Grade Distribution:

$\geq 90.00$	A	70.00 - 74.99	C
85.00 - 89.99	B+	65.00 - 69.99	D+
80.00 - 84.99	B	60.00 - 64.99	D
75.00 - 79.99	C+	$\leq 59.99$	F

## COURSE POLICIES AND EXPECTATIONS

Participation: Participants are expected to attend every class meeting and to get involved in the discussion. We will learn much more if we explore the mathematics together. Out-of-class participation is also expected, so read the text and other classroom materials. Get to know the instructor and other students in class, exchange phone numbers, work together on assignments, and give each other moral support.

*Your participation grade will be based on both in-class and out-of-class participation. This includes, but is not limited to: answering and asking questions in class, participating in class activities, asking questions outside of class, visiting the professor in his office, completing Challenge Exercises, and so on.*

Cell Phones: Make sure that your cell phone is off and away during our sessions. I will do you this courtesy; I ask only that you reciprocate.

Attendance: Attendance will be taken for my records, but will not affect your grade. However, be respectful of your peers and instructor; *frequently arriving late and/or disrupting class will not be tolerated.* We are all adults here and we should treat each other with the same respect we desire.

Academic Integrity: I expect you to familiarize yourself with the Honor Code found in the current Student Handbook. Keep in mind that “Any student who violates this Honor Code or who knowingly assists another to violate this Honor Code shall be subject to discipline.”

Students with Disabilities: Students who would like to request accommodations for disabilities should talk to me as soon as possible. *Before accommodations can be made,* students must register with the Office of Student Disability Services. I am not qualified to assess any disabilities.

Make-Up Policy: Make-up exams and quizzes will not be allowed. To compensate for possible emergencies/disasters, I will allow the Final Exam to replace any missed Midterm Exam and I will drop your lowest two quiz grades at the end of the semester. Missing the Final Exam will not be rectified unless the instructor is made aware of your intent to reschedule at least three weeks in advance *with sufficient reason.*

# ADDENDUM 1

## TESTING AND GRADING POLICIES

Below I will outline my testing and grading policies. Of course, policies can (and may) change as the semester progresses - I will let you know if this is to occur.

**HOMEWORK** Many homework problems will be suggested (see schedule below); these homework problems will commonly double as questions on quizzes. Students are expected to submit only one question from each topic during the semester. Students need only submit *ten correct solutions* throughout the semester to earn the 10% of their grade designated for homework. Correct solutions of higher difficulty problems will count towards your participation grade. Additionally, the instructor will also create 5-10 Challenge Exercises throughout the semester. These Challenge Exercises will be updated periodically on Blackboard and the instructor's website.

**QUIZZES** Approximately one quiz will be given weekly. In general you can expect 1-2 questions on the quiz and you will have 10-15 minutes to complete them. Questions for the quizzes will be selected to reflect the material covered in the preceding 2-4 classes. Doing your homework and understanding the nature of the homework problems assigned is the best way to prepare for quizzes. In fact, homework problems will commonly double as questions for the quizzes.

**EXAMS** Midterm Exams:

Midterm exams will be monthly (see schedule below). Calculators (and other electronic devices) will not be permitted during exam. A typical exam will have 4-5 exercises covering the material and you will be given 75 minutes to complete it.

Exam Grading:

Each exercise will be assigned a number of points indicated on the exam. Full credit will show that you had full understanding of the question and did all math properly. Missing a few points will indicate that the understanding of the question was there, but some math was done incorrectly. The correct answer with no work will receive 0 points.

## COURSE OUTLINE

Class #	Date	DAY	Proposed Topic	Homework (odd #'s only)
1	1/15	T	Intro	Review Syllabus
2	1/17	Th	1.1	1-9, 13-21, 27-41
	1/17	Th	1.2	1-17, 25-33
3	1/22	T	1.2	1-17, 25-33
	1/22	T	1.3	1-5, 11-17
4	1/24	Th	1.4	1-15, 19-23, 33-45, 49-61
5	1/29	T	1.5	1-25, 31-41
6	1/31	Th	1.6	1-21, 31-39, 43-51, 57-61
	1/31	Th	REVIEW	
7	2/5	T	EXAM I	
8	2/7	Th	2.1	1-5, 9-21
9	2/12	T	2.2	5-21
	2/12	T	2.3	1-11, 19-25
10	2/14	Th	2.4	1-5, 11-15, 25
	2/14	Th	2.5	1-5
11	2/19	T	3.1	1-47
	2/19	T	3.2	1, 7-17, 21-25
12	2/21	Th	3.3	1-31
13	2/26	T	3.4	1-17 (odd), 24-26 (all)
14	2/28	Th	REVIEW	
15	3/5	T	EXAM II	
16	3/7	Th	3.5	1-27, 31-37, 45, 53-63
17	3/19	T	3.6	1-6 (all)
18	3/21	Th	3.7	1, 7, 11-25
19	3/26	T	7.1	1-31, 35-41
20	3/28	Th	7.2	1-5, 11-23 (odd) 27-33 (all)
21	4/2	T	7.3	1-21, 27-35
22	4/4	Th	7.4	1-33
23	4/9	T	7.5	1-29, 33-37
24	4/11	Th	REVIEW	
25	4/16	T	EXAM III	
26	4/18	Th	4.1	1-7, 11-15, 17-25
27	4/23	T	4.2	1-11
28	4/25	Th	REVIEW	
	5/7	T	FINAL EXAM	4:00pm

# HOMEWORK TOPICS COVERED

10 correct solutions required - no more than 3 from each group  
Solutions for each topic must be submitted before the midterm exam on that topic.

*I suggest keeping this page for your own records.*

Group #	Section #	Topic	Problems (odd #'s only)	Completed
1	1.1	Verifying Solutions	1-9, 13-21	
	1.1	Writing Diff Eqns	27-41	
	1.2	Diff Eqns from Calculus	1-17, 25-33	
	1.3	Determining Uniqueness	11-17	
2	1.4	Separable Eqns	1-15, 19-23, 33-45, 49-61	
	1.5	First-Order Linear Eqns	1-25, 31-41	
	1.6	Substitution Method	1-21, 43-51, 57-61	
	1.6	Exact Eqns	31-39	
	2.1-2.2	Population Models	2.1: 1-5, 9-21; 2.2: 5-21	
	2.3	Acceleration-Velocity Models	1-11, 19-25	
	2.4-2.5	Approximation Methods	2.4: 1-5, 11-15, 25; 2.5: 1-5	
3	3.1	Second-Order Linear Eqns	1-47	
	3.2	General Linear Eqns	1, 7-17, 21,25	
	3.3	Constant Coefficients	1-31	
	3.4	Mechanical Vibrations	1-17 (odd), 24-26 (all)	
4	3.5	Undetermined Coefficients	1-27, 31-37	
	3.5	Variation of Parameters	45, 53-63	
	3.6	Forced Oscillations	1-6 (all)	
	3.7	Electrical Circuits	1, 7, 11-25	
5	7.1	Laplace Transforms - Intro	1-31, 35-41	
	7.2	Initial Value Problems	1-5, 11-23 (odd), 27-33 (all)	
	7.3	Translation and Partial Fractions	1-21, 27-35	
	7.4	Derivatives, Integrals, and Products	1-33	
	7.5	Periodic Fcns	1-29, 33-37	
6	4.1	Simplifying to Systems Eqns	1-7, 11-15	
	4.1	Solving Systems	17-25	
	4.2	Method of Elimination	1-11	