

SYLLABUS FOR MATH 353-03: ELEMENTARY DIFFERENTIAL EQUATIONS

SPRING SEMESTER 2020

Course Information

Instructor: Dr. Erwin Miña-Díaz Office: Hume Hall 317 Office hours: M. W. 1:00-2:00 PM.
Email: minadiaz@olemiss.edu Telephone: (662) 915-1204
Text: D. G. Zill, A first course in differential equations (classic 5th edition), Brooks/Cole 2001.
Time/Place: T. Th. 1:00-2:15 PM, Jackson Avenue Center A005

Course description/learning objectives

This course is an introduction to ordinary differential equations. We intend to cover Chapters 1, 2, 4, and 7 of the textbook, plus a few topics from other sections. This includes first-order differential equations and their applications, linear differential equations of higher order, and the Laplace transform.

The successful student will acquire a good knowledge of the topics studied in the course, being able to recognize the type of a differential equation and apply proper methods to solve it. The course will prepare the student for those higher level courses in Mathematics, Physics, Engineering, and Economics, where a basic understanding of ordinary differential equations is needed.

Homework, tests and final exam

The homework problems are assigned at the end of the second page. Doing the homework is imperative in order to do well in this course.

There will be 4 tests (each 100 points) and a comprehensive final exam (200 points). Your final exam grade will replace your lowest test score. Test and final exam dates are indicated in the tentative schedule below.

The cumulative point total for the course is 600 points. The grade scale is as follows: $A \geq 93\%$, $A^- \geq 90\%$, $B^+ \geq 87\%$, $B \geq 83\%$, $B^- 80\%$. $C^+ \geq 77\%$, $C \geq 70\%$, $D \geq 60\%$, $F < 60\%$. An "I" grade will not be given without the permission of the Department of Mathematics.

IMPORTANT: There will be no make-up tests given for any reason other than an official university function, in which case the student must reschedule and take this test at a time before the test is scheduled to be given. Any student having three or more final examinations scheduled for the same day will arrange with the instructor to take the examination on some other, mutually satisfactory date.

Attendance, cheating, electronic devices

- Students are allowed 3 absences. Ten points are deducted from the final point total per each additional absence. It is the student's responsibility to make sure his/her attendance record is correct.
- Cheating on any exam or quiz, theft or attempted theft of exam questions, possession of exam questions prior to the time for examination, or the use of an illegal calculator/smart phone on tests or quizzes shall all be offenses subject to appropriate penalties.
- No calculators allowed in any test/exam. All cellular phones, pagers, and other electronic equipment must be turned off during the class period.

Deadlines

Monday, March 2 is the deadline for course withdrawals. After the course withdrawal deadline, courses dropped will be recorded on University records and the W grade will be recorded if the student is not failing the course at the time of withdrawal; otherwise the grade recorded will be F. After the course withdrawal deadline, a student may drop a course only in cases of extreme and unavoidable emergency as determined by the academic dean; dropping a course after the deadline will not be permitted because of dissatisfaction over an expected grade or because the student is changing his/her major.

Disability Access and Inclusion

The University of Mississippi is committed to the creation of inclusive learning environments for all students. If there are aspects of the instruction or design of this course that result in barriers to your full inclusion and participation, or to accurate assessment of your achievement, please contact the course instructor as soon as possible. Barriers may include, but are not necessarily limited to, timed exams and in-class assignments, difficulty with the acquisition of lecture content, inaccessible web content, and the use of non-captioned or non-transcribed video and audio files. If you are approved through SDS, you must log in to your Rebel Access portal at <https://sds.olemiss.edu> to request approved accommodations. If you are NOT approved through SDS, you must contact Student Disability Services at 662-915-7128 so the office can: 1. determine your eligibility for accommodations, 2. disseminate to your instructors a Faculty Notification Letter, 3. facilitate the removal of barriers, and 4. ensure you have equal access to the same opportunities for success that are available to all students.

TENTATIVE TEST DATES AND HOMEWORK ASSIGNMENTS

TEST 1 (Thursday, February 6)

Chapter 2. First-order differential equations.

- Order of an ODE and verification of a solution to an ODE
- Separable Equations
- Linear equations
- Exact equations
- Homogeneous equations

TEST 2 (Thursday, February 27)

- Bernoulli equation

Chapter 4. Linear differential equations of higher order.

- Linear independence and Wronskian
- Constructing a second solution from a known solution
- Homogeneous equations with constant coefficients

TEST 3 (Thursday, March 26)

- Method of undetermined coefficients
- Method of variation of parameters

TEST 4 (Thursday, April 16)

- Cauchy-Euler equations

Chapter 7. Laplace transform.

- Laplace Transform and its inverse
- First translation theorem
- Transforms of derivatives
- Initial value problems using Laplace transform (simpler cases)

FINAL EXAM (Thursday, May 7 at Noon)

The final exam is comprehensive, and will include the following topics from Chapter 7 not listed above:

- Second translation theorem
- Derivatives of transforms
- Initial value problems using Laplace transform (more complex cases)

HOMEWORK PROBLEMS

1.1 Ex: 1-6, 11-15, 21, 28, 35, 49, 50

2.2 Ex: 1-16, 41-45.

2.5 Ex: 1-16, 41, 42, 45.

2.4 Ex: 1-15, 25, 26.

2.3 Ex: 11-26, 31-33.

2.6 Ex: 1-6.

4.1.1 Ex: 1-5.

4.1.3 Ex: 33-44.

4.2 Ex: 1-15.

4.3 Ex: 1-20, 37-40.

4.4 Ex: 1-16.

4.7 Ex: 1-16, 25-27, 29-31.

6.1: Ex: 1-16

7.1 Ex: 1, 3, 11-17.

7.2 Ex: 1-22, **and** 7.5 Ex: 1-8.

7.3 Ex: 1-36, 61-64, **and** 7.5 Ex: 9-18.

7.5. Ex: 19-26.