

Differential Equations

MAP 2302: Elementary Differential Equations

University of Florida, Spring 2014

LIT 113, MWF9 (4:05-4:55)

Instructor information:

Vince Vatter

Office: Little Hall 412

Office hours: Mondays and Wednesdays 3:00–3:55, and by appointment

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Text:

Fundamentals of Differential Equations and Boundary Value Problems, 6th edition, by Nagle, Saff, and Snider.

Course Objectives:

First-order ordinary differential equations, theory of linear ordinary differential equations, solution of linear ordinary differential equations with constant coefficients, the Laplace transform and its application to solving linear ordinary differential equations.

Grading:

We will have four in-class midterm exams and a comprehensive final exam. The dates of the in-class midterm exams are:

- Monday, January 27,
- Monday, February 17,
- Monday, March 24, and
- Friday, April 18.

The midterms will collectively count for 70% of your grade. The final exam will count for 30%. **No scores will be dropped.**

The final grades will be curved, but will be no tougher than the 10-point scale: 90%–100% will be some form of A, 80–90% will be at least some form of B, etc. After each midterm, you will receive a projected grade.

If you have a disagreement with the grading of one of your solutions, I ask that you submit a written request for reconsideration within one month.

Tentative Schedule:

Lecture	Date	Topics	Section(s)
1	M 1/6	Introduction	1.3 & 2.2
2	W 1/8	Separable equations Suggested exercises: 1–21 odds	2.2
3	F 1/10	Linear equations Suggested exercises: 1–21 odds	2.3
4	M 1/13	Explicit & implicit solutions Suggested exercises: 1, 3, 5, 7, 15, 23, 25, 27 (Section 1.2)	1.2
5	W 1/15	Exact equations Suggested exercises: 1–15 odds, 21, 23	2.4
6	F 1/17	Homogeneous equations Suggested exercises: 9–15 odds	2.6
	M 1/20	<i>Class canceled for Martin Luther King Jr. Day</i>	
7	W 1/22	Bernoulli equations and equations of the form $dy/dx = G(ax+by)$ Suggested exercises: 1–7 odds, 17–39 odds	2.6
	F 1/24	<i>Class canceled due to stupid substitute forgetting to show up</i>	
	M 1/27	Review for Midterm #1: practice problems	, solutions
	W 1/29	Midterm #1	
8	F 1/31	Second-order linear homogeneous differential equations I Suggested exercises: 1–19 odds (Section 4.2) and 9–27 odds (Section 4.3)	4.2 & 4.3
9	M 2/3	Second-order linear homogeneous differential equations II	4.2 & 4.3

	1/29		
8	F 1/31	Second-order linear homogeneous differential equations I Suggested exercises: 1–19 odds (Section 4.2) and 9–27 odds (Section 4.3)	4.2 & 4.3
9	M 2/3	Second-order linear homogeneous differential equations II Suggested exercises: 1–19 odds (Section 4.2) and 9–27 odds (Section 4.3)	4.2 & 4.3
10	W 2/5	The method of undetermined coefficients I Suggested exercises: 9, 11, 13, 15 (Section 4.4) and 3, 5, 7, 17, 19 (Section 4.5)	4.4 & 4.5
11	F 2/7	The method of undetermined coefficients II Suggested exercises: 17, 19, 21 (Section 4.4) and 23–29 odds (Section 4.5)	4.4 & 4.5
12	M 2/10	Variation of parameters I Suggested exercises: 1– 17 odds	4.6
13	W 2/12	Variation of parameters II practice problems	4.6
	F 2/14	Review for Midterm #2: practice problems	, solutions
	M 2/17	Midterm #2	
14	W 2/19	The Laplace transform I Suggested exercises: none!	7.2 & 7.3
15	F 2/21	The Laplace transform II Suggested exercises: 1–11 odds (Section 7.2) and 1–21 odds (Section 7.3)	7.2 & 7.3
16	M 2/24	The inverse Laplace transform Suggested exercises: 1–29 odds	7.4
17	W 2/26	Solving IVPs with the Laplace transform Suggested exercises: 15–23 odds	7.5
	F 2/28	Review: problems	, solutions
		<i>Spring Break</i>	
18	M 3/10	Piecewise and periodic functions I Suggested exercises: 1–17 odds, 29, 31 (piecewise functions)	7.6
19	W 3/12	Piecewise and periodic functions II Suggested exercises: 21–31 odds, 41 (periodic functions)	7.6
	F 3/14	Review: problems	, solutions
20	M 3/17	Impulses and the Dirac Delta Suggested exercises: 1–19 odds	7.8
21	W 3/19	Convolution Suggested exercises: 1-21 odds	7.7
	F 3/21	Review for Midterm #3: practice problems	, solutions
	M 3/24	Midterm #3 : official formula sheet	
22	W 3/26	Review of power series Suggested exercises: none, but please do practice with Taylor series	8.2
23	F 3/28	Power series solutions to ODEs Suggested exercises: 11–27 odds.	8.3
24	M 3/31	More of the same Suggested exercises: 13, 15, 21, 23, 29	8.4
25	W 4/2	Cauchy-Euler equations Suggested exercises: 1–9 odds	8.5
26	F 4/4	Springs and the mass-spring analogy Suggested exercises: 11, 15 (Section 4.8)	4.1 & 4.8 (pgs. 206–209 only)
27	M 4/7	Free mechanical vibrations I Suggested exercises: 1–13 odds	4.9
28	W 4/9	Free mechanical vibrations II	4.9
29	F 4/11	Forced mechanical vibrations I	4.10
30	M 4/14	Forced mechanical vibrations II	4.10
	W 4/16	Review for Midterm #4: practice problems	, solutions
	F 4/18	Midterm #4 : official formula sheet	

W 4/16	Review for Midterm #4: practice problems	, solutions
F 4/18	Midterm #4 : official formula sheet	
M 4/21	Review for Final Exam I	
W 4/23	Review for Final Exam II	
Th 5/1	Final Exam, 5:30 p.m. – 7:30 p.m.	