MAP2302
Sections: 3141, 3142, 3145, 3146
Elementary Differential Equations
Spring 2025
Course Coordinator: Carol Demas

I. General Information

Instructor and Class Meetings

Instructor	Section	Period	Room	Office	Office Hours	email
Dr. Alex York	3141/12682	4	LIT 109	LIT 437		a.york@ufl.edu
Carol Demas	3142/12683	5	LIT 109	LIT 323	MWF 6rd	demasc@ufl.edu
Dr. Scott Keeran	3146/12684	6	LIT 109	LIT309		keeran@ufl.edu
Dr. Larissa Williamson	3145/24831	7	LIT 109	LIT 380		lwill@ufl.edu

Teaching Assistants and Grader

Name	Office	Office Hours	Email
TBA			

Course Description

This course covers 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, and Series Solutions. (M)

Prerequisites

MAC 2312 or MAC 2512 or MAC 3473 with a minimum grade of C..

General Education Credit

- Mathematics

This course accomplishes the [General Education](#) objectives of the subject area listed above. A minimum grade of C is required for General Education credit. Courses intended to satisfy General Education requirements cannot be taken S-U.

Required Readings and Works

We will use the textbook Fundamentals of Differential Equations and Boundary Value Problems by R. Kent Nagle, Edward B. Saff and Arthur David Snider, ISBN-13: 978-0321977106, ISBN-10: 9780321977106. You may use the previous edition and/or the version without boundary value problems if you prefer.

Materials and Supplies Fees: N/A

II. Graded Work

Description of Graded Work

Assignment	Assignment Description	General Education Mathematics SLOs Met	% of Grade
Lecture Quizzes	After each lecture, you will take a short canvas quiz on the material covered on that day. The two lowest lecture quiz grades will be dropped at the end of the semester. Each has two attempts.	*Communication, Content, Critical Thinking.*	**10%**
Online Quizzes	There will be online quizzes with one attempt each approximately every 3-4 lectures, based on the homework and classwork. If a TA is unable to address your questions, please contact the course coordinator. Your two lowest online quizzes will be dropped at the end of the semester.	*Communication, Content, Critical Thinking.*	**10%**

Online Homework	One for each lecture, unlimited attempts before the due date. The lowest two scores are dropped.	*Communication, Content, Critical Thinking.*	**10%**
Midterm Exams	Exam 1 covers First Order DEs (L1-L9) Exam 2 covers Second Order (L11-L17) DEs, Exam 3 Covers Laplace Transforms (L18-L24)	*Communication, Content, Critical Thinking*	**52.5%**
Final Exam	Comprehensive, 50% previous material and 50% series solutions	*Communication, Content, Critical Thinking*	**17.5%**
Extra credit	Optional Practice Exams	*Communication, Content, Critical Thinking*	**Up to 5% bonus**

Grading Scale

Your final grade will be rounded to the nearest hundredth and a letter grade will be given using the following grading scale. For information on how UF assigns grade points, visit: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

A	≥90%		C	≥67%
A-	≥87%		C-	≥64%
B+	≥84%		D+	≥60%
B	≥80%		D	≥57%
B-	≥87%		D-	≥54%
C+	≥74%		E	<54%

A minimum grade of C is required for General Education credit. Courses intended to satisfy General Education requirements cannot be taken S-U.

Attendance and Participation

Attendance: Attendance in lecture is strongly recommended. Students who come to class and participate are more likely to do well in the course.

Excused absences are consistent with university policies in the undergraduate catalog and require appropriate documentation:

https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Period 4 will be available via Zoom and the recorded lectures will be posted in Canvas. Attendance is required for exams.

III. Annotated Weekly Schedule

Week	Topic	Textbook Required Reading Sections	Assigned Work Due
Week 1	Introduction and terminology, Solutions and Initial Value problems, Direction Fields	1.1-1.3	Precalculus quiz (1 attempt) Syllabus quiz (unlimited attempts) LQ1, LQ2 (2 attempts) HW1, HW2 (unlimited attempts)
Week 2	Euler Method, Separable DEs	1.4, 2.1-2.2	HW3-HW5 LQ3-LQ5 Quiz 1 (1 attempt)
Week 3	Linear Equations, Exact Equations, Integrating Factors	2.4-2.5	HW6-HW7 LQ6-LQ7 Quiz 2
Week 4	Substitutions, First Order Applications, Mass Spring Oscillator,	2.6, 3.1, 4.1	HW8-HW9 LQ8-LQ9 Quiz 3
Week 5	Exam 1 Review Homogenous Linear 2nd order DEs,	4.2	HW10-HW11 LQ10-LQ11 Exam 1 (suggested) Practice Exam 1
Week 6	Complex Roots Method of Undetermined Coefficients,	4.3,4.4	HW12-HW13 LQ12-LQ13 Quiz 4
Week 7	Principle of Superposition Variation of Parameters, variable coefficient equations	4.5-4.7	HW14-HW15 LQ14-LQ15 Quiz 5
Week 8	Variable coefficient equations, Exam 2 Review	4.7	HW15-HW16 LQ15-LQ16 Quiz 6 (suggested) Practice Exam 2
Week 9	Exam 2 Review, Laplace Transform definition, properties,	7.2, 7.3	Exam 2 LQ17-LQ18 HW17-HW18
Week 10	Inverse Laplace Transform Solving Initial Value Problems with Laplace Transforms, Discontinuous Functions	7.4-7.6	LQ19-LQ21 HW19-HW21 Quiz 7
Week 11	Convolution Dirac Delta	7.7, 7.8 (old edition),	LQ22-LQ24 HW22-HW24

	Taylor Polynomial	7.7,7.9 (new edition) 8.1	Quiz 8 (suggested) Practice Exam 3
Week 12	Review, Power Series Review, Power Series Solutions	8.2, 8.3	Exam 3 LQ25-LQ26 HW25-HW26
Week 13	Analytic Coefficients	8.3, 8.4	Quiz 9 LQ 27 HW 27
Week 14	Analytic Coefficients Stability and Phase Plane	8.4, 5.4	Quiz 9 LQ 28-29 HW 28-29
Week 15	Review		Quiz 10 (suggested) Practice Exam 4

IV. Student Learning Outcomes (SLOs)

At the end of this course, students will be expected to have achieved the General Education learning outcomes as follows:

- **Content:** Students demonstrate competence in the terminology, concepts, theories, and methodologies used within the discipline. After completing this course students will be able to employ strategies in solving problems in limits, differentiation, and integration. (Critical Thinking for Gen Ed Math, assessed through homework, lecture and discussion quizzes, exams)

- **Communication**: Students communicate knowledge, ideas, and reasoning clearly and effectively in written and oral forms appropriate to the discipline. Throughout this course students will formulate and solve mathematical model using algebraic, trigonometric, exponential, and logarithmic functions, differentiation, and integration, and will communicate mathematical solutions clearly and effectively. (Communication for Gen Ed Math, assessed through homework, lecture and discussion quizzes, exams)

- **Critical Thinking**: Students analyze information carefully and logically from multiple perspectives, using discipline-specific methods, and develop reasoned solutions to problems. In this course, students will reason in abstract mathematical systems, and they will apply mathematical models using algebraic, trigonometric, exponential, and logarithmic functions, differentiation techniques, calculation of exact areas under curves, application of rates of change to physical examples of position, velocity and acceleration, identifying the limit of algebraic and transcendental functions, using the derivative as a tool for approximation through differentials and linear approximation, among countless other applications. to solve problems. They will also develop and solve mathematical models of real-world word problems. (Critical Thinking for Gen Ed Math, assessed through homework, lecture and discussion quizzes, exams).

Category	Institutional Definition	Institutional SLO	Specific to the Course

Content	Content is knowledge of the terminology, concepts, methodologies and theories used within the subject area.	Students demonstrate competence in the terminology, concepts, methodologies and theories used within the subject area.	Students will gain knowledge of terminology, approximating solutions to differential equations via graphical and computations methods, analytical methods for solving first and second order differential equations, and Taylor and power series solutions to differential equations.
Critical Thinking	Critical thinking is characterized by the comprehensive analysis of issues, ideas, and evidence before accepting or formulating an opinion or conclusion.	Students carefully and logically analyze information from multiple perspectives and develop reasoned solutions to problems within the subject area	Students will apply their knowledge to solve problems concerning topics that include, but are not limited to solving differential equations that are separable, linear, exact, exact with integrating factor, solved using substitutions, and solved by approximations including graphical, computational, and series methods.
Communication	Students carefully and logically analyze information from multiple perspectives and develop reasoned solutions to problems within the subject area	Students carefully and logically analyze information from multiple perspectives and develop reasoned solutions to problems within the subject area.	Throughout this course students will communicate mathematical ideas through writing on quizzes and exams.

VI. Policies

Students Requiring Accommodation

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

UF Evaluations Process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens and can complete evaluations through the email,

they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructors in this class.

Counseling and Wellness Center

Contact information for the Counseling and Wellness Center: http://www.counseling.ufl.edu/ , 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Free Help-The Little Hall Math Lab

In addition to attending your discussion section regularly and visiting the office hours of your instructor and teaching assistant, for help, the Little Hall Math Lab located in Little Hall 215 offers free drop-in assistance with math homework Monday through Friday from 9:30 to 4:00, as well as test reviews before each math exam and other resources. It is staffed by mathematics graduate students and undergraduate tutors. Please note that this space is not designed for intense one-on-one tutoring, but rather as a resource for quick questions and explanations. You should not expect the staff to help you if you have not at least begun your homework and have specific questions. Moreover, they absolutely will not assist you with quizzes or any other such work. More details are available here: https://oas.aa.ufl.edu/students/tutoring/

In-Class Recordings

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.
A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.
Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole

or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Canvas Messages

Check your Canvas messages, Canvas announcements, and the front page of Canvas **daily** so that you do not miss any important announcements.

Requirements

A hardwired connection (not wireless) is strongly recommended when working and submitting assignments. It is the student's responsibility to have a reliable internet connection, adequate internet speed and cleared cache and cookies before starting each assignment.

Time commitment

University students are expected to spend at least 3 hours for each hour lecture in order to keep up with the course material.

Content

We will cover Chapters 1(Introduction), 2(First Order ODEs), 4(Second Order ODEs), 7(Laplace Transforms), and some of 8(Series Solutions) and 6(Higher Order DEs).

Homework

Doing homework is essential to success in this course and is one of the best ways to prepare for quizzes and tests. Online homework is completed in Canvas. Homework is worth 10% of the grade. The lowest two scores are dropped. Each homework has **unlimited attempts**. Students who miss parts of a multiple-part question should feel free to ask about which parts were missed.

Lecture Quizzes

There is a lecture quiz for each lecture with **two attempts** each. The lowest two scores are dropped. Lecture Quizzes are worth 10% of the course grade. Online quizzes are 30-50 minutes long.

Quizzes

There will be ten online quizzes covering 2-4 lectures with **one attempt** each. The lowest two scores are dropped. Quizzes are worth 10% of the course grade. Online quizzes are 30-50 minutes long.

Discussion board

There is one discussion board for each exam period. If you have a question, please show your work and state the assignment from which the problem comes. The question must not have already been asked so read the boards daily. If you ask a question that has been answered in an online conference, you will be directed to watch the video of that conference unless you require specific clarification. Discussion boards are locked at 10 PM the night before each exam.

Practice Exams

Four online practice exams are suggested to be completed by the dates shown in the calendar. Practice exams will count as extra credit. Practice exams may be reviewed in class shortly after the due date.

Exams

Three live evening assembly exams will be given on the dates shown in the calendar from **8:20PM-9:50PM.**
Exam 1: TBA
Exam 2: TBA
Exam 3: TBA
The fourth (final) exam is comprehensive and held **Saturday, April 26 7:30AM-9:30 AM**
Each exam is worth 17.5% of your grade. Bring only pencils and erasers. External aids, communication with other students during the exam, and calculators or other electronic devices are not permitted. **Infractions will be reported to the Dean of Students Office**. If you fail to turn in your scantron or turn in a blank scantron, your scantron will be scored as 0. If you fail to turn in the free response portion of your exam it will be scored as 0. It is your responsibility to turn in the correct and completed items when you have completed your exams. If you do not see a multiple-choice score in Canvas within a week of your exam, contact the course coordinator. Scantron errors in form code, section number, name, UFID, or filled in with an incorrect writing utensil will result in a 5% deduction. You must use a #2 pencil for your scantron. Free response errors in name will result in a 5% deduction. Taking one's exam in the wrong room will result in a 20% deduction.

Makeup Exams

If you miss an exam with valid documentation, you may take a makeup. If you miss without valid documentation, there will be a 20% penalty. Valid documentation includes documented illness, school sponsored activity, death in the immediate family, court-ordered or military appointments, and religious holidays. Scheduled flights do not count as valid documentation so do not make plans for a flight which conflicts with exam dates and times. If you miss a second exam, the comprehensive fourth exam will replace it. If documentation is not supplied, there is a 20% penalty for each missed exam. Upload the appropriate documentation for makeup requests to the "Request for Makeup Exam" assignment in Canvas.

Exam makeups are held on Tuesday April 22 in the early evening. If you have a conflict with another assembly exam in a course that has a higher course number or a religious observance on

an exam date, **please request your exam makeup within the first two weeks of the semester to qualify for a makeup, otherwise there will be a deduction of 10% to take the makeup.** If illness or other extenuating circumstances cause you to miss an exam, contact the course coordinator immediately (no later than 24 hours after the exam) by email. Then, as soon as possible upload the appropriate documentation to the "Request for Makeup Exam" assignment in Canvas.

To be eligible for a make-up you must have completed at least 75% of the course work that has been given so far. **Any and all students who request exam makeups or miss exams for any reason must complete the appropriate "Request for Makeup Exam" assignments in Canvas and attach appropriate documentation.**

Late submissions

Due date is not do date! Please do not wait to begin your assignments the day that they are due. If there are any last-minute difficulties with your computer or access, you will be out of luck. Homework, lecture quizzes, and quizzes can be submitted late with a 25% penalty for each day beyond the due date. If documented illness or other extenuating circumstances cause you to miss a deadline for an assignment, **you will be granted late penalty removals**. You must contact the course coordinator for details.

False Late Penalties

If you revisit past due assignments that you previously submitted on time, Canvas automatically confers late penalties. These must be removed by hand. **Rather than revisiting past-due assignments, keep written records of your solutions and review them**.

VII. Daily Schedule

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	Jan 13	14	15	16	17
	L1		L2		L3
					Due: Precalc Q, Syllabus Q, LQ1, HW1
2	20	21	22	23	24
	Holiday		L4		L5
			Due: LQ2, HW2		Due: LQ3, HW3
3	27	28	29	30	31
	L6		L7		L8
		Due: Quiz 1 (L1-L3)	Due: LQ4, HW4		Due: LQ5, HW5
4	Feb 3	4	5	6	7
	L9		L10		Review
	Due: LQ6, HW6	Due: Quiz 2 (L4-L6)	Due: LQ7, HW7		Due: LQ8, HW8
5	Feb 10	11	12	13	14
	L11		L12		L13
	Due: LQ9, HW9	Due: Quiz 3(L7-L9) Exam 1 (L1-L10)	Due: LQ10, HW10 suggested PE1		
6	Feb 17	18	19	20	21
	L14		L14		L15
	Due: LQ11, HW11		Due: LQ12, HW12		Due: LQ13, HW13, Quiz 4 (L11-L13)
7	Feb 24	26	26	27	28
	L16		L17		L17
	Due: LQ14, HW14		Due: Due: LQ15, HW15 Quiz 5 (L14-L15)		Due: LQ16, HW16
8	Mar 3	4	5	7	7
	Review	Exam 2	L18		L19
	Due: LQ17, HW17 Suggested PE2 Due: Quiz 6 (L16-L17)				Due: LQ18, HW18
9	Mar 10	11	12	13	14
	L20		L21		L22
	Due: LQ19, HW19		Due: LQ20, HW20		Due: LQ21, HW21 Quiz 7 (L18-21)
10	Mar 17	18	19	20	21
	Holiday		Holiday		Holiday
11	Mar 24	25	26	27	28
	L23		L24		Review

Week	Mon	Tue	Wed	Thu	Fri
	Due: LQ22, HW22		Due: LQ23, HW23		Due: LQ24, HW24 Suggested PE3, Quiz 8 (L22-24)
12	Mar 31	Apr 1	2	3	4
	Exam 3 (L18-24)		L25		L25
13	Apr 7	8	9	10	11
	L26		L26		L27
			Due: LQ 25, HW25		Due: LQ 26, HW26
14	Apr 14	15	16	17	18
	L27/L28		L28		L29
		Due: Quiz 9 (L25-26)	Due: LQ 27, HW27		Due: LQ 28, HW28
15	Apr 21	22	23	24	25
	Review	Exam 1-3 Makeups	Review	Reading	Reading, no class
	Suggested: PE4 Due: Quiz 10 (L27-28)		Due: HW 29, LQ29		

- HW (unlimited attempts), LQ (2 attempts), Syllabus Quiz (unlimited attempts), Precalc Quiz (1 attempt only): all due 11:59 PM
- Exam 1-3 Makeup April 22 Time TBA
- PE: practice exams, unlimited attempts, not for credit but highly recommended
- Final Exam: Saturday, April 26 7:30AM-9:30 AM
- Final Exam Makeup: Monday April 28 Time TBA

VIII. Lecture Topics and Tentative Book HW (not collected for grade)

Ed.		7th (mechanical clock)	6th (apple)
Lec	section	problems	problems
1	1.1 Background	1-11 odds	same
2	1.2 Solutions and IVPs	1-11 odds, 21-27 odds	same
3	1.3 Direction Fields	1-7 odds, 11-17 odds	same
4	1.4 Euler Method	1,3,5, take two steps only	same
5	2.2 Separable	1-25 odds	same
6	2.3 Linear	1-21 odds	same
7	2.4 Exact	1-25 odds	same
8	2.5 Exact w/ Integrating Factor	1-11 odds	same
9	2.6 Substitutions	1-27 odds	same
10	1st order apps	2.4 33, 3.2 23-25 3.3 1-5 odds	same
11	4.1 Mass Spring Oscillator	1-9	same
12	4.2 Linear 2nd Order	1-19 odds, 27-31 odds	same
13	4.3 Complex Roots	1-25 odds	1-17 odds, 21-25 odds
14	4.4 Undetermined Coefficients	1-25 odds, 27-31 odds	same
15	4.5 Superposition	9-35 odds	11-19 odds, 23-25 odds, 31-35 odds
16	4.6 Variation of Parameters	1-9 odds,11	same
17	4.7 Variable Coefficients	1-13 odds,19-20,41-44	1-13 odds,19-20,37-39 odds, 45-47 odds
18	7.2 Laplace Transform	1-19 odds	same
19	7.3 Properties	1-9 odds,13-17 odds, 25	same
20	7.4 Inverse Laplace Transform	1-25 odds	same
21	7.5 Solving IVPs	1-7 odds, 12, 15-23 odds	same
22	7.6 Discontinuous Functions	1-17 odds, 21-23 odds, no sketch	1-17 odds
23	7.8 Convolution	1-21 odds, 23, 25	**7.7** 1-21 odds, 23, 25
24	7.9 Dirac delta	1-17 odds, no sketch, 25, 27	**7.8** 1-17 odds, no sketch, 25, 27
25	8.1 Taylor Polynomial	1-5 odds, 9a	same
26	8.2 Power Series	1-5, odds, 11-13 odds,17-27 odds, 29, 33	same
27	8.3 Power Series Solutions	1-27 odds	same
28	8.4 Analytic Coefficients	1-15 odds	same