

MAP 2302
SUMMER 2023

SYLLABUS

COURSE TITLE: Elementary Differential Equations

CATALOG DESCRIPTION: 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.

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

Attributes: General Education - Mathematics

COURSE CONTENT: MAP 2302 is designed to serve the students in engineering, physics, and mathematics. The course gives the fundamental knowledge necessary for understanding and solving differential equations of the most basic types and applying this knowledge to real life phenomena.

INSTRUCTOR: **Dr. Larissa Williamson**
Office: LIT 380
Office Hours: in-person: M, W, F: 11 am – 12:15 pm
or by Appointment (via Zoom or in-person)
E-mail: lwill@ufl.edu
Webpage: <https://people.clas.ufl.edu/lwill/>

Request for an Office Hour by Appointment has to be sent at least 48 hours in advance.

E-MAIL: The **Instructor** will communicate with the students and reply to ALL email messages received from the students **ONLY** via Canvas **Inbox** tool.

The Course Management System is E-Learning (Canvas): <https://elearning.ufl.edu/>

Course materials are divided into **4 Units** with a total of 19 Modules, M01-M19:

<u>Unit 1</u>	M01 – M04	Introduction to First Order Differential Equations
<u>Unit 2</u>	M05 – M08	Mathematical Modeling
<u>Unit 3</u>	M09 – M14	Linear Differential Equations
<u>Unit 4</u>	M15 – M19	Laplace Transforms

(See the last page of this Syllabus for the Modules coverage and the list of sections of the textbook that match the content of the Modules.)

Course Calendar

Summer 2023	Monday	Tuesday	Wednesday	Thursday	Friday
July	3 M1 L	4 Holiday	5 M2 L	6 M3 L	7 M4 L
	10 M5 L	11 HW: M1-M4 due Discussion1 Quiz-Unit1: M1-M4	12 M6 L	13 M7 L Project due	14 M8 L
	17 Discussion2	18 HW: M5-M8 due Review1 L	19 Exam1: M1-M8	20 M9 L	21 M10 L
	24 M11 L	25 M12 L	26 M13 L	27 M14 L	28 M15 L
August	31 HW: M9-14 due Discussion3 Quiz-Unit3: M9-M14	1 M16 L	2 M17 L	3 M18 L	4 M19 L
	7 Discussion4	8 HW: M15-19 due Review2 L	9 Exam2: M9-M19	10 Review3 L	11 Final Exam (optional)

Course Structure

LECTURES & DISCUSSIONS: The students are required to attend lectures/discussions on the dates indicated on the Calendar as “M# L” and “Discussion#”, and lecture participation will be taken during the class time (see LECTURE PARTICIPATION in this syllabus).

REVIEWS: On the dates indicated in the calendar as “Review# L”, the lecturer discusses the material that will be covered on the upcoming exam. Exam Review sheets can be found under the link Lecture Notes on Canvas. Participation in these sessions is very important and attendance will be taken.

MODULES & DUE DATES: It is advisable to start working on a Module no later than on the date indicated on the Calendar as “M# L” when the corresponding live lecture is delivered, so that you can stay on track and avoid having too many Modules to complete by the Due Date. Working on M01-M19 requires completing MyLab Online Homework (HW) (see ONLINE HOMEWORK in this Syllabus.)

Delivering Content

TEXTBOOK & ACCESS CODE: We use the following textbook in this course:

Fundamentals of Differential Equations and Boundary Value Problems, 7th edition,
by R. Kent Nagle, Edward B. Saff, and Arthur D. Snider*

Access code to **MyLab and Mastering** is required in the course. **Access code can be obtained through [UF All Access](#) program by authorizing charges to your student financials account and is provided at a reduced price.** ** This option will become available starting one week prior to the beginning of the semester and ends three weeks after the first day of class.

If you do not wish to authorize charges to your student financials account, you may purchase access code at the Campus bookstore instead (<https://www.bkstr.com/floridastore>), which will be more expensive than opting-in.

* Registration with MyLab gives you access to an electronic version of the textbook. If you wish to have a printed text, you may purchase it at the bookstore.

****Please see “Course Materials & Registration Instructions” on E-Learning (Canvas) for complete information on obtaining access code through UF All Access and registration with Pearson’s MyLab and Mastering.**

LECTURE NOTES: Lectures in this course are delivered using Lecture notes shells which can be printed from the Canvas page Lecture Notes. Lecture notes shells make note taking easier and are required in the course. The whole set of Lecture notes shells (Course Pack) will become available for purchase at Target Copy (1412 W University Ave, Gainesville, FL 32603, <http://target-copy.com/>) at the beginning of the term.

TEXTBOOK READINGS: Reading the textbook is a part of the learning process. The students are strongly recommended to read the corresponding sections of the textbook after (or before) attending a lecture and before doing homework on MyLab (see LECTURES & DISCUSSIONS and ONLINE HOMEWORK in this Syllabus). The sections of the textbook that match the content of the Modules are listed on the last page of these syllabus.

Assessments

ONLINE HOMEWORK: Each online **Homework assignment** (HW) is a set of problems assigned on MyLab and numbered according to the Module covered. A HW assignment will give you the necessary practice for mastering the material delivered in lecture. Each homework assignment is due at 11:59 pm on the due date, which is indicated in the Course Calendar, on Canvas, and on MyLab & Mastering. **A HW will be closed after the deadline and cannot be re-opened without a legitimate reason.** Credit for a HW will be given according to the percent value of the correct work completed. Review of a completed HW after the deadline will be available via MyLab gradebook – a non-attempted HW cannot be reviewed. Each HW assignment is worth 4 points. There will be a total of 19 HW assignments offered, and **1 lowest score will be dropped** at the end of the term.

LECTURE PARTICIPATION: Starting with M03 lecture (as the drop-add period ends), lecture participation points will be given for the attendance. A total of 24 sessions will be graded. Each session is worth 1.5 points. Unexcused absence will result in a zero. **The 2 lowest scores on the LP** will be dropped at the end of the term.

QUIZZES: There will be **two (2) unit quizzes**, Quiz-Unit1 and Quiz-Unit3, offered on the dates indicated in the Calendar. Each is a 35-minute quiz on the corresponding Unit, and it contains 10 multiple-choice questions at 3 points each.

EXAMS: There will be **two (2) midterm Exams** and an optional Final Exam offered during the regular class time on the dates indicated in the course Calendar. Exam1 covers Units 1-2, Exam2 covers Units 3-4, and the Final Exam covers Units 1-4.

The **midterm Exams** are free-response and will be hand-graded on a scale from 0 to 60. There will be 8 bonus points available on each Exam. It may be necessary to miss an Exam during the term or you might not be satisfied with one of your grades earned on the Exams. For these reasons, an optional Final Exam will be given at the end of the term. The best 2 out of the 3 exam scores (Exam1, Exam2, and the Final Exam) will count.

NOTE: You must show all work on a midterm Exam to receive full credit.

The **Final Exam** is OPTIONAL and will be given on the last day of classes. The Final is cumulative all multiple-choice questions and worth 60 points. There will be 17 questions at 4 points each – 2 questions are for bonus.

Software Policy

Scientific calculators are required in the course and allowed on the Exams.

A graphing calculator is needed for some homework problems, but it can be replaced with suitable software, such as MATLAB, which is available via UF Apps.

The students will have an option to learn MATLAB programming environment in relation to the topics covered in the course, but **it is not required**. There will be a **Bonus MATLAB Project** offered at the beginning of the term which is worth 10 points. The points earned on the Project will be added to the score for **Quiz-Unit1**.

For more information on the Bonus Project, please visit the link “MATLAB Project” on the Canvas course homepage.

Makeup Policy

MAKEUP POLICY ON ONLINE HOMEWORK, ATTENDANCE & QUIZZES: If you are not meeting the deadline for a homework assignment or missing a lecture or a unit Quiz on a **legitimate reason** (being sick, being away on a UF business, family emergency, religious holidays), you may send an email to Dr. Williamson via **Canvas Inbox** tool either prior to the deadline or within one (1) day after the deadline and request an extension or a make-up – **a reason of the request has to be clearly specified and the Instructor may request documentation**. Missing a **Unit Quiz** without a legitimate reason and making it up later will result in a 5-point penalty - a request for an extension must be sent no later than within one (1) day after the deadline for the Quiz. **Late requests will not be accepted!**

MAKEUP POLICY ON EXAMS: If you are missing a midterm Exam due to a legitimate reason (being sick, being away on a UF business, family emergency, religious holidays) you have two options: either to take the Final Exam as a make-up (see section EXAMS in this syllabus) or, if you wish to make it up before the last day of classes and save the Final for another test, you can schedule a make-up earlier – please see **Dr. Williamson in LIT 380** during her office hours or send her a request via Canvas email either prior to the Exam or within one (1) day after the Exam. **A reason for the request must be clearly specified and the instructor may request documentation. Late requests will not be accepted!**

IMPORTANT NOTES: You can discuss with your Instructor a midterm Exam, Unit Quiz, HW, and MATLAB Project **within one (1) day** and the Final Exam – **within the same day** upon receiving the grades if there is a grading error or any other problem. **Late requests will not be accepted!**

All issues with Canvas, MyLab & Mastering, and UF Apps/MATLAB must be reported immediately and documented when sending a request for an extension or retake.

Grade

COURSE GRADE: The course grade is assigned based on the student’s performance on the following weighted categories:

			Totals:		
22	Lecture Participation	@ 1.5 points	33 points	11.58 %	
18	On-line homework	@ 4 points	72 points	25.26 %	
2	Unit Quizzes	@ 30 points	60 points	21.05 %	
2	Exams	@ 60 points	<u>120 points</u>	<u>42.11 %</u>	
	Grand Total:		285 points	100 %	

The course grade is the grade satisfying the conditions below and **will be adhered** to:

	Minimum %		Minimum %
A	90 %	C	66 %
A-	86 %	C-	62 %
B+	82 %	D+	58 %
B	78 %	D	54 %
B-	74 %	D-	50 %
C+	70 %	E	0 %

Note: We have 0.5% round up margin towards a higher letter grade.

GRADE POSTING: All grades will be posted in a timing manner on E-Learning (Canvas) at <https://elearning.ufl.edu/>. We strongly recommend verifying regularly that your grades are handled and recorded correctly. **You should immediately report any problem with your grade to your instructor.**

Miscellaneous

Help: Please visit *Academic Resources* website (the link is listed below) for the information on UF Help services:

<https://academicresources.clas.ufl.edu/>

Grades: Grading will be in accord with the UF policy stated at <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Honor Code: “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](#) 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 instructor or TAs in this class.”

Class Attendance: “Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx> “

Accommodations for Students with Disabilities: “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.”

Online Evaluations: “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/>.”

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

Course Content and Module Coverage

Unit 1: Introduction to First Order Differential Equations

M 01	Solutions & Initial Value Problems (Sections 1.1, 1.2)
M 02	Direction Fields & Euler's Method (Sections 1.3, 1.4)
M 03	Separable Equations & Applications (Sections 2.1, 2.2)
M 04	Linear & Bernoulli Equations (Sections 2.3, 2.6)

Unit 2: Mathematical Modeling

M 05	Exact Equations & Mathematical Modeling (Sections 2.4, 3.1, 3.2)
M 06	Population Models & Heating/Cooling (Sections 3.2, 3.3)
M 07	Newtonian Mechanics & Electrical Circuits (Sections 3.4, 3.5)
M 08	Numerical Methods (Sections 3.6, 3.7)

Unit 3: Linear Differential Equations

M 09	Homogeneous Linear Equations (Sections 4.1, 4.2)
M 10	Auxiliary Equations with Complex Roots & Mass-Spring Systems (Section 4.3)
M 11	Nonhomogeneous Linear Equations & Undetermined Coefficients (Section 4.4)
M 12	The Superposition Principle & Variation of Parameters (Sections 4.5, 4.6)
M 13	Variable Coefficient Linear Equations (Section 4.7)
M 14	Closer Look at Mechanical Vibrations (Sections 4.9, 4.10)

Unit 4: The Laplace Transform

M 15	Definition & Properties of the Laplace Transform (Sections 7.1, 7.2, 7.3)
M 16	Derivatives and the Inverse of the Laplace Transform (Sections 7.3, 7.4)
M 17	Initial Value Problems & Transf. of Discontinuous Functions (Sections 7.5, 7.6)
M 18	Transforms of Periodic and Power Functions & Convolution (Sections 7.7, 7.8)
M 19	Impulses & Dirac Delta Function (Section 7.9)