MAT-235: Differential Equations

Fall 2018

In order to solve this differential equation you look at it until a solution occurs to you.

GeorgePólya

Professor:	Thomas R. Cameron	**Time:**	M W F 1:30 – 2:20 pm
Email:	thcameron@davidson.edu	**Place:**	CHAM 3084

Course Page: https://www.thomasrcameron.com/courses/MAT-235/mat_235.html
Office Hours: M W F 2:30 – 4:00 pm, Th 10:30 am – 12:00 pm, and by appointment in CHAM 3044.

Textbook: Edwards, Penny, and Calvis, *Differential Equations and Boundary Value Problems, Computing and Modeling*, (5e), 2019
Technology: Mathematica, Excel, DFIELD, and PPLANE
Prerequisite: Calc II and MAT-150

Course Description: A study of solution techniques and models in ordinary differential equations including first order equations, linear differential equations, series solutions, Laplace transform methods, and concepts of numerical and graphical techniques applied to equations and systems.

Learning Outcomes: Students will be able to

- Write differential equations and interpret given differential equations that model changing phenomena.
- Determine if a solution for an initial value differential equation must exist and be unique by theorem and prove a function is the solution.
- Classify differential equations and determine what solution methods might be helpful.
- Solve separable first order, linear first order, and constant coefficient second order linear differential equations.
- Solve constant coefficient linear systems of differential equations.
- Create and interpret slope field or phase portraits for differential equations and systems of differential equations.
- Produce and interpret solution curves from numerical approximation methods.
- Describe long-term behavior of solutions to autonomous differential equations, and systems of differential equations, by equilibrium point analysis.
- Show how infinite power series can give functions, and polynomial approximations, for solutions to differential equations, even when elementary formula is impossible.

Grading Policy:
Your final grade is broken up as follows.

Category	Percentage
Attendance	5%
Lab	10%
EFY	10%
Homework	25%
Reviews (10% each)	30%
Final Review	20%

Your final letter grade is based on the following scale.

Grade	Percentage Interval	Grade	Percentage Interval
A	$[93, 100]$	C+	$[76, 80)$
A-	$[90, 93)$	C	$[73, 76)$
B+	$[86, 90)$	C-	$[70, 73)$
B	$[83, 86)$	D+	$[66, 70)$
B-	$[80, 83)$	D	$[63, 66)$
		F	$[0, 63)$

Attendance: Each week there will be an in class assignment whose write-up I collect at the end of class. These assignments will be grade on completion and quality of in class discussions. I will drop your three lowest scores.

Lab: Every so often we will use Mathematica and Excel to model physical phenomena using the differential equation theory from the course. Students are expected to work through the lab examples and return a printed copy of their work to me by the due date.

EFY: Exercises For You will be given on Monday of selected weeks and turned in that following Friday. Students are expected to work in groups and be accountable to one another.

Homework: On average, homework assignments will be due every other week. These assignments are posted online at least one week in advance. Students should include their name, course number, and assignment number on each assignment before they turn it in. Students should turn these in my midnight on the due date.

Reviews: Throughout the semester, three reviews will be given to test the student's understanding of the

concepts covered up to that point.

Final Review: The final review will test the students on a comprehensive selection of topics from the course.

Academic Honesty: Students are expected to complete all graded work in accordance with the Davidson College Honor Code, as it applies to each assignment in this class.

Special Accommodations: The college welcomes requests for accommodations related to disability and will grant those that are determined to be reasonable and maintain the integrity of a program or curriculum. To make such a request or to begin a conversation about a possible request, please contact the Office of Academic Access and Disability Resources, which is located in the Center for Teaching and Learning in the E.H. Little Library: Beth Bleil, Director, bebleil@davidson.edu, 704-894-2129; or Alysen Beaty, Assistant Director, albeaty@davidson.edu, 704-894-2939. It is best to submit accommodation requests within the drop/add period; however, requests can be made at any time in the semester. Please keep in mind that accommodations are not retroactive.

Disclaimer: I reserve the right to diverge from this syllabus in the best interest of the course. Any changes made will be announced.