

University of Connecticut
Math 2410Q-010/015, Elementary Differential Equations, Spring 2017

Instructor Information

Instructor: Noah Hughes

Webpage: <http://www.math.uconn.edu/~hughes/>

Email: noah.hughes@uconn.edu (Expect responses only between the hours of 9am and 6pm.)

Office: Monteith, Room 322

Office Hours: **Tues/Thurs** 10:00-10:50 am, **Wed** 4:00-4:50pm or by appointment.

Course Description and Requirements

From the department: An introduction to ordinary differential equations and their applications, linear differential equations, systems of first order linear equations, numerical methods.

We will cover most of the first three chapters of the text and selected topics from chapters 4, 5 and 6. The goal of this course is to introduce you to the study of ordinary differential equations via analytical, qualitative and numerical methods.

Text: *Differential Equations* 4th ed., by Paul Blanchard, Robert L. Devaney, and Glen R. Hall.

Prerequisites: Math 1132Q (Calculus II). Math 2210Q (Linear Algebra) is recommended but not required.

Calculators: You are welcome to use TI-83, TI-84 or similar models of calculators. They will not be required.

Assessments

I hear, I forget; I see, I remember; I do, I understand. – Chinese proverb

Homework: A schedule of assignments will be posted to the course webpage. These assignments will not be collected. The webpage can be found here:

<http://www.math.uconn.edu/~hughes/math2410s17/>

In Class Quizzes: (worth 20% of your final grade)

A quiz will be given at the end of class every Monday. Each will consist of one or two problems from the previous week's material and should take about 10 minutes.

- Your lowest quiz grade will be dropped at the end of the semester.
- Answer keys to quizzes will be posted on the course webpage.

Exams: There will be three exams in total:

- Exam 1 (Friday, February 17, worth 25% of your final grade)
- Exam 2 (Friday, April 7, worth 25% of your final grade)
- Final exam (Wednesday, May 3, 3:30-5:30 in [PB 38](#), cumulative and worth 30% of your final grade)

Make-Up Work

Unexcused absence during exams or quizzes will be tolerated only in highly unusual documented circumstances (e.g., hospitalization). You may arrange with me well in advance if accommodations are needed.

Tentative Schedule

A tentative outline for the course can be found on the following page.

Academic Integrity

Integrity is a vital to a successful and rewarding academic experience. You are expected to observe the University's Academic Integrity Policy while participating in this course. Academic misconduct of any sort is subject to the consequences outlined therein. More information can be found at the [Office of Community Standards](#).

Special Accommodations

Student athletes and students with disabilities should inform me of their commitments as an athlete, or any special needs that they have, etc. within the first three weeks of the semester. A letter from the Athletics Department or the Center for Students with Disabilities will be required for accommodations to be given. For more information on academic accommodations (including religious observances) visit the [University of Connecticut Policy & Procedures website](#).

Disclaimer

I reserve the right to make changes to this document in partiality or entirety at any point during the semester.

Week	Date	Section	Topic
1	1/18	1.1	Modeling via Differential Equations
		1.2	Separation of Variables
2	1/23	1.3	Slope Fields
		1.4	Euler's Method
3	1/30	1.5	Existence and Uniqueness of Solutions
		1.6	Equilibria and the Phase Line
4	2/6	1.7	Bifurcations
		1.8	Linear Equations
5	2/13	1.9	Integrating Factors
	2/15		Exam 1 (Tentative)
	2/17	2.1	Modeling via Systems
6	2/20	2.2	The Geometry of Systems
		2.3	The Damped Harmonic Oscillator
		2.4	Additional Analytic Methods for Special Systems
7	2/27	2.5	Euler's Method for Systems
		2.6	Existence and Uniqueness for Systems
		2.7	SIR model of an Epidemic
8	3/6	3.1	Properties of Linear Systems and the Linearity Principle
		3.2	Straight-Line Solutions
9	3/13		Spring break - No classes.
10	3/20	3.3	Phase Portraits for Linear Systems with Real Eigenvalues
		3.4	Complex Eigenvalues
11	3/27	3.5	Repeated and Zero Eigenvalues
	3/29		Exam 2 (Tentative)
	3/31	3.6	Second-Order Linear Equations
12	4/3	3.7	The Trace-Determinant Plane
		4.1	Forced Harmonic Oscillators
13	4/10	4.2	Sinusoidal Forcing
		4.3	Undamped Forcing and Resonance
14	4/17	5.1	Equilibrium Point Analysis
		6.1	Laplace Transforms
15	4/24	6.2	Discontinuous Functions
		6.3	Second Order Equations
		6.4	Delta Functions and Impulse Forcing
16			Final Exam (Date, time and location TBA)