Math 2410Q – UCONN at Stamford – Spring Semester 2023 - Elementary Differential Equations – Room Residence Hall A from January 17, 2023, to April 28, 2024, Tuesdays and Thursdays 3:30 pm – 4:45 pm. *Comprehensive Final Exam on a date in May to be announced by UConn in the first two weeks of March 2023*

Instructor: Cristiano Husu E-mail: cristianohusu@sbcglobal.net, 203 329 0489 (do call between 9 am to 9 pm), cristiano.husu@uconn.edu, 203 251 9537.

OFFICE HOURS in person in Residence Hall A

Mondays, from 5:55 pm to 6:25 pm,

Tuesdays, from 4:45 pm to 5:15 pm,

Wednesdays, from 5:55 pm to 6:25 pm,

Thursdays, from 4:45 pm to 5:15 pm,

and additionally by appointment emailing cristianohusu@sbcglobal.net.

Lecture Notes: Detailed lecture notes will be available before each class.

Recommended textbook: A First Course in Differential Equations, with Modeling Applications 11th ed., by Dennis G. Zill, Chapters 1, 2, 3, 4, 5, 6, 7 and 8.

Course Description: Introduction to ordinary differential equations and their applications, linear differential equations, systems of first order linear equations, numerical and qualitative methods.

Prerequisites: Math 1132Q (Calculus II). Note that, although recommended, Math 2110Q, Calculus III, and Math 2210Q, Linear Algebra, are not required.

Classwork and Homework: Homework will be assigned at the end of most classes. Samples of the homework will be collected one week after the assigned date. Classwork quizzes on previously assigned homework will take place once every other week.

Grading Procedure: The course grade will be the (weighted) sum of the following four portions at the top of the following page:

1) Class participation, classwork and Homework, altogether 20% of the course grade,

2) The first examination on February 23, another 20% of the course grade,

3) The second examination on April 13, another 20% of the course grade,

4) The comprehensive final examination, on a date TBA in March, the remaining 40%. of the course grade.

Additional percentage points will be available via extra credit work. The standard grading system will be applied to the total number of points acquired during the semester:

A as course grade for 90 (90%) points and above,

B as course grade for 80 (80%) to 89 points and above,

C as course grade for 70 (70%) to 79 points and above,

D as course grade for 60 (60%) to 69 points and above,

A week-by-week description of the course follows.

Week	Date	Section	Topic
1	1/16+1	1.1	Definitions and Terminology
	1/19	1.2	Initial Valued Problems and Differential Equations associated to Initial Valued Problems – A Theorem of Existence and Uniqueness of Solutions of Initial Value Problems
2	1/24	1.3	Differential Equations as Mathematical Models
	1/26	2.1	Solution Curves - Direction Fields of First-Order Differential Equations – Phase Lines of Autonomous First-Order Differential Equations
3	1/31	2.2	Separable First-Order Differential Equations
	2/2	2.3	Linear First-Order Differential Equations
4	2/7	2.4	Exact First-Order Differential Equations
	2/9	2.5, 2.6	Solutions by Substitutions. Euler's Numerical Method for First-Order Differential Equations
5	2/14	3.1 and	Linear Models. Nonlinear Models. Spring/Mass

		5.1	Systems. Free Dumped Motion. Circuits.
	2/16	3.2, 3.3	Modeling with Systems of First-Order Differential Equations *Review for the First Examination on Chapters 1, 2 and Section 3.1*
6	2/21	4.1.1 and 4.1.2	Linear Differential Equations and Linear Homogeneous Differential Equations - differential equations - lecture notes 11 - linear differential equations and linear homogeneous differential equations with two theorems of existence and uniqueness of solutions of initial value problems with such differential equations
	2/28		*First Examination on Chapters 1, 2 and Section 3.1*
7	2/23	4.1.3	Nonhomogeneous Linear Differential Equations - Introduction to the method of undetermined coefficients – Introduction to the Superimposition approach
	3/2	4.2	Reduction of Order for Second-Order Linear Differential Equations. Additional Analytic Methods for Special Systems
8	3/7	4.3	Further work on Homogeneous Linear Equations with constant coefficients
	3/9	4.4	Further work on Nonhomogeneous Linear Equations with constant coefficients and on the Method of Undetermined Coefficients – the Superimposition approach
9	3/14		*Spring break*
	3/16		*Spring break*
10	3/21	B1 and B2	Matrices. Basic Definitions. The Gauss-Jordan Elimination Procedure
	3/23	B3	Eigenvalues and Eigenvectors of Square Matrices. The Eigenvalue Problem
11	3/28	4.5 and 4.6	The Annihilation approach to the method of Undetermined Coefficients - The Variation of Parameters for Second Order Differential Equations
	3/30	8.2.1	Homogeneous Linear Systems of Differential Equations: Distinct Real Eigenvalues
12	4/4	8.2.2	Homogeneous Linear Systems of Differential Equations: Repeated Real Eigenvalues
	4/6	8.2.3	Homogeneous Linear Systems of Differential

			Equations: Complex Cojugated Eigenvalues. *Review for the Second Examination on Chapter 4 and Sections 3.2, 3.3, 5.1*
13	4/11	7.1	*Power series solutions of differential equations (extra credit).*The Laplace Transform
	4/13		*Second Examination on Chapter 4 and Sections 3.2, 3.3, 5.1 and 8.2.1*
14	4/18	7.2	The Inverse Laplace Transform
	4/20	7.3	Operational Properties of the Laplace Transform, Part I
15	4/25	7.4	Operational Properties of the Laplace Transform, Part II. *Comprehensive review for the final examination*
	4/27	7.5 6.1, 6.2, 6.3	*Extra Credit: The Laplace transform of the Dirac delta functions and its applications.* *Power series solutions of differential equations (also extra credit work).*
	On a date TBA (in March)		Comprehensive Final Examination