Spring 2023 Course Announcement

University of Maine – Department of Mathematics & Statistics
MAT 500 Topics in Graduate Mathematics – Section 0001
Topic: Nonlinear Differential Equations

Instructor: Peter Stechlinski.

Lectures: MoWeFr 9:00 AM – 9:50 AM, Neville 421.

Text: Differential Equations and Dynamical Systems by Lawrence Perko.

Course description (3 credits): This course covers the fundamental theory of nonlinear ordinary differential equations (ODEs) in a comprehensive manner. The main goal is to characterize the qualitative behavior of solutions, including invariant sets and limiting behavior, using a variety of tools. The course begins with a treatment of linear systems of differential equations before developing a local theory for nonlinear systems, revisiting topics from introductory courses on ODEs with more mathematical depth and rigor. Global theory of nonlinear systems is then developed before concluding with an examination of bifurcation theory.

Prerequisites: Grade of C or better in MAT 262 and MAT 259, or MAT 258, or permission of the department. Familiarity with rigorous proofs (e.g., MAT 261, MAT 425) is recommended.

Please get in touch if you have any questions (peter.stechlinski@maine.edu).

This course satisfies the requirements for the major and the minor in mathematics.