



SPRING 2026 COURSE ANNOUNCEMENT

MAT 559: ADVANCED ORDINARY DIFFERENTIAL EQUATIONS

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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 ODE systems before developing a local theory for nonlinear ODE systems, revisiting topics from introductory courses on ODEs with more mathematical depth and rigor. Global theory of nonlinear ODE systems is then developed before concluding with an examination of bifurcation theory and special topics, as time permits.

Prerequisites: A grade of C or better in MAT 259 and MAT 262 and MAT 425, or a grade of C or better in MAT 258 and MAT 425, or departmental permission.

Please get in touch if you have any questions.

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

