



# A Course in Ordinary Differential Equations, Second Edition

*Stephen A. Wirkus, Randall J. Swift*

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**A Course in Ordinary Differential Equations, Second Edition** teaches students how to use analytical and numerical solution methods in typical engineering, physics, and mathematics applications. Praised for its extensive computer code and student-friendly approach, the first edition of this popular textbook was the first on ordinary differential equations (ODEs) to include instructions on using MATLAB®, *Mathematica*®, and Maple™. This second edition reflects the feedback of students and professors who used the first edition in the classroom.

## New to the Second Edition

- Moves the computer codes to Computer Labs at the end of each chapter, which gives professors flexibility in using the technology
- Covers linear systems in their entirety before addressing applications to nonlinear systems
- Incorporates the latest versions of MATLAB, Maple, and *Mathematica*
- Includes new sections on complex variables, the exponential response formula for solving nonhomogeneous equations, forced vibrations, and nondimensionalization
- Highlights new applications and modeling in many fields
- Presents exercise sets that progress in difficulty
- Contains color graphs to help students better understand crucial concepts in ODEs
- Provides updated and expanded projects in each chapter

Suitable for a first undergraduate course, the book includes all the basics necessary to prepare students for their future studies in mathematics, engineering, and the sciences. It presents the syntax from MATLAB, Maple, and *Mathematica* to give students a better grasp of the theory and gain more insight into real-world problems. Along with covering traditional topics, the text describes a number of modern topics, such as direction fields, phase lines, the Runge-Kutta method, and epidemiological and ecological models. It also explains concepts from linear algebra so that students acquire a thorough understanding of differential equations.

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