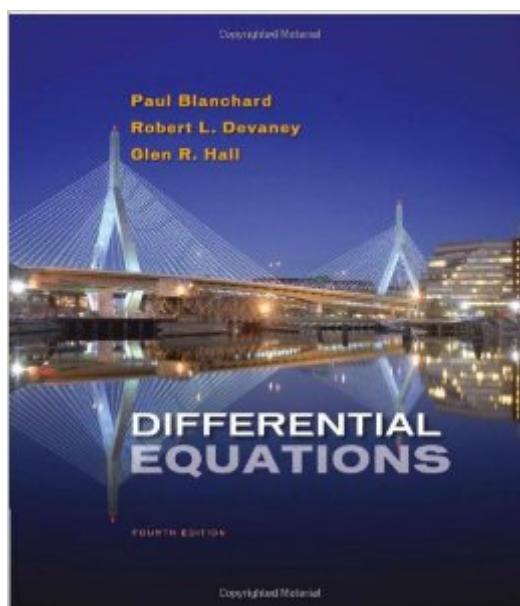


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# Differential Equations



## Synopsis

Incorporating an innovative modeling approach, this book for a one-semester differential equations course emphasizes conceptual understanding to help users relate information taught in the classroom to real-world experiences. Certain models reappear throughout the book as running themes to synthesize different concepts from multiple angles, and a dynamical systems focus emphasizes predicting the long-term behavior of these recurring models. Users will discover how to identify and harness the mathematics they will use in their careers, and apply it effectively outside the classroom.

## Book Information

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## Customer Reviews

I used this text to teach differential equations to advanced high school seniors and it worked extremely well. After considering several other texts, I was sold on this book for three reasons:1. Rather than older-style differential equations books that focus on analytic methods, this book has a consistent approach of using a combination of analytic, qualitative, and numerical methods. As an industrial mathematician, most differential equations that I worked with could not be solved analytically and thus numerical and qualitative techniques became key tools.2. The friendly expository style of the authors motivates the material and is easier for students to understand than more formal textbooks. New material is always introduced by concrete examples before getting into theory.3. The book is written from a dynamical systems point of view and the authors tap into many interesting results from the past 40-50 years, e.g., the Lorenz equations, modeling epidemics, adaptive shock absorbers, etc.Perhaps my most pleasant surprise teaching the course was how

much the students liked and learned from DETools, the differential equation software that comes with the textbook. We regularly used DETools in class (there's essentially no learning curve) and its use energized the students and made much more clear to them the nature of solutions. I also found the exploratory projects at the end of each chapter very valuable. My students liked the challenge of these more general and open-ended problems, and the projects solidified their understanding. As far as the nuts and bolts of teaching the course, I typically covered one section per day, and we did most of the sections in Chapters 1-6.

As another reviewer wrote - it reads like a novel, but is short on explanations and examples, and full of many errors. For reference, I'm a consistent A/B student in math and science and have always placed very well on standardized tests, and as an adult work in computer science where I am very successful. I have also taken a differential equations class using the book by Penney, which in my opinion, is terse on explanations, but better at explaining how to approach, setup, and solve differential equations. But back to this book: The good: Book reads like a novel and can explain, in concept, some of the theories and theorems of ordinary differential equations. Intuitively you can get a feel for the topics. However, you only feel good until you must do actual work in solving these equations, then that's when it hits you the authors have not prepared you well enough. The bad: Book is short on examples, and the examples provided are not consistent with the types of problems in the exercises at the end of each chapter. The examples show really nice clean trivial computations, but even the earliest examples at the end of the chapter throw you into the deep end of the pool. Huge disconnect. Personally, I don't mind tough problems as that's where you really learn, but you need a few warm ups before you jump into that deep end. This book does not provide warm ups, or an adequate number of exercises in general. Many topics only have one or two exercises to learn from. Compare that to say, a physics textbook, which often has 5 or 6 per topic so if you get stuck on one, you can try another and if you figure it out you can use what you learned to attempt the first problem again and maybe work your way through. Not this book.

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