**Top 10 Reasons to use the book:**

***Time Series for Data Science: Analysis and Forecasting***

***by Woodward, Sadler, and Robertson***

1. **The book is extremely easy to read and to teach from.**This is a unique book that is easy to teach from and is also very accessible to advanced undergraduates and graduate students in Data Science, Statistics and even MBA students studying advanced business analytics. The material in the book has been polished and curated from years of teaching time series in the Data Science and Applied Statistics and Data Analytics Masters’ programs at Southern Methodist University (SMU). All three authors are award winning professors at SMU. Our experience has been that existing books for this audience tend to either be “cookbooks” or tend to get bogged down in the mathematics. The book is written at a level accessible to students who have little or no calculus, but at the same time is in no way a “cookbook” of time series methods. There’s lots of “meat” and discussion of the why and not just the how. We have taken a great deal of effort trying to help students understand this field.
2. **It’s an exciting new book that includes a collection of topics designed especially for data science students.**  
   The best way to illustrate this is to list the topics covered in the chapters. The following is a summary of the material covered in the book.

Chapter 1 is devoted entirely to discussing time series datasets, what they are, characteristic behaviors often seen in time series data, where to find and access such data, as well as methods of wrangling and cleaning time series data. That is, we don’t discuss analysis in this chapter, just data. We also introduce the basics of using R and the CRAN time series package *tswge.*

Chapter 2 covers topics such as data smoothing, data decomposition, seasonal adjustment, exponential smoothing, and Holt-Winters forecasting. This chapter is designed to help students get an introductory feel for examining and transforming time series data for purposes of getting a better understanding of the information in the data.

Chapter 3 is a unique introduction to fundamental statistical concepts, a discussion of the difference between a simple random sample and a time series realization, why correlation can “be your friend”, and an introduction to stationary time series.

Chapter 4 provides a brief, understandable introduction to the frequency domain and spectral estimation. We have noticed that many books at this level include a frequency domain chapter later in the book just to mention it and briefly cover some of the uses of the frequency domain. We introduce it early because we will be using spectral estimation, etc. as we analyze time series data.

Chapters 5-6 cover ARMA modeling, including such topics as the factor table for understanding the underlying components of the model, model identification, parameter estimation, and forecasting. These topics are covered in detail, and students who go through this material will understand the models and concepts. They will not simply end up thinking of these models as black boxes as I believe some textbooks present them.   
  
Chapter 7 addresses nonstationary time series data and their analysis using ARIMA and seasonal models. We discuss model identification, estimation, and forecasting using these models. We also provide material on ARCH/GARCH models including discussion of the models and how to fit these models to data.  
  
Chapter 8 provides a unique and hands-on look at time series regression along with its features and shortfalls. We examine regression models that include a linear trend and those that include harmonic behavior.

Chapter 9 includes two case studies: the analysis of global temperature and sunspot data. This chapter gives students a thorough discussion of the considerations and implications that go into selecting a time series model.

Chapter 10 illustrates how to use outside information by presenting multivariate topics including multiple regression with correlated errors and the VAR model for modeling and forecasting multivariate time series data.

Chapter 11 presents a clear coverage of increasingly popular neural network/deep learning methods for analyzing time series data. It also includes an example of how an ensemble of neural network and parametric models may provide, as George Box might say, a “useful” model.

1. **The book is accompanied by an easy-to-use R package (tswge).**

For software choice, we have created an R package tswge, which is available on CRAN to accompany this book. Extensive discussion of the use of tswge functions is given within the chapters and in appendices following each chapter. The tswge package currently contains about 70 functions and that number will continue to grow. Consult the book’s website http://timeseriesfordatascience.com for updates concerning the software and the book. We have added guidance concerning R usage throughout the entire book, including code for nearly all examples and corresponding figures. The CRAN package tswge also contains many datasets, several of them containing real data, including a collection of datasets associated with figures and examples in the book. Because of the clearly described R syntax, students should not be required to have previous knowledge of R. The number of examples and the focus on participation by the reader to enter the provided R code will ground the students with the necessary R coding skills. In fact, this textbook could be a resource for an introductory course in R programming with time series applications.

1. **Throughput the book there are hands-on examples that can be used to reinforce the material**

A distinguishing feature of the book is its strong emphasis on encouraging students to participate as they read through the chapters. The engaged student is encouraged to type in the code and/ or copy and paste code segments available from the website to reproduce examples and corresponding plots and output.

1. **80 instructional videos are accessible throughout the book via QR codes**  
   Approximately 80 QR codes, strategically placed throughout the chapters, link to tutorial videos produced by the authors. These videos are key learning tools for the student. The videos typically offer additional detail on a particular topic, carefully explain a particularly important example, or, in a few cases, introduce a related topic or method. It is important to note that the book could be consumed independently of these videos and extra resources; however, the resources available through the QR codes can offer significant.
2. **The book can be used by students with or without a calculus background**

Prerequisites for the readers of the text are relatively minimal. A calculus background is valuable but not necessary for students using this book. The book is surprisingly advanced without falling back on calculus-based derivations. We believe that the book is accessible to serious students who have not had courses in calculus or a statistics course beyond the introductory level. While we are concerned that this may “turn off” some instructors, we believe that you will be surprised at the mathematical rigor yet applied nature of this book. Give it a try!! For instructors or students interested in more mathematical detail, we have provided supplemental videos produced by the authors, in-depth appendices, and references to related resources (textbooks, journal articles, etc.).

1. **Key Points are highlighted**

Throughout the book, important ideas are pulled out and shown as Key Points. This assures that the reader will not overlook important content in the reading.

1. **The book is designed to provide the reader with tools, tools, tools that can be immediately applied in the workplace**

The authors realize that many readers of this book will be working as analysts or are involved in coursework preparing for a position in the exploding data science job market. This book presents a wide number of tools that can be immediately used in the workplace, and students who have taken this course tell us that they have been able to immediately use the techniques on the job.

1. **Forecasting techniques discussed in this book can help improve productivity on the job**

One of the primary uses of time series in the field of data science is for forecasting. The book provides forecasting and prediction tools such as time series regression, ARMA/ARIMA forecasting, Holt/Winters forecasting, and forecasting in multivariate settings using multiple regression with correlated errors and the VAR model. We also present forecasting techniques using neural network/deep learning methods. Ensemble methods for forecasting are also discussed.

1. **The book is supported by dedicated website and GitHub sites**

The GitHub site <https://github.com/BivinSadler/Time-Series-for-Data-Science> has all the code used in the book, data sets, and other resources!  It’s worth checking out. The website is <https://timeseriesfordatascience.com/>