PRINCETON

Textbooks
2014

contents

The Theory of Corporate Finance
Jean Tirole

http://press.princeton.edu/titles/8123.html
Exercises & Answers (2MB)
Lecture
Transparencies
Errata

The past twenty years have seen great theoretical and empirical advances in the field of corporate finance. Whereas once the subject addressed mainly the financing of corporations—equity, debt, and valuation—today it also embraces crucial issues of governance, liquidity, risk management, relationships between banks and corporations, and the macroeconomic impact of corporations. However, this progress has left in its wake a jumbled array of concepts and models that students are often hard put to make sense of.

Here, one of the world's leading economists offers a lucid, unified, and comprehensive introduction to modern corporate finance theory. Jean Tirole builds his landmark book around a single model, using an incentive or contract theory approach. Filling a major gap in the field, *The Theory of Corporate Finance* is an indispensable resource for graduate and advanced undergraduate students as well as researchers of corporate finance, industrial organization, political economy, development, and macroeconomics.

Tirole conveys the organizing principles that structure the analysis of today's key management and public policy issues, such as the reform of corporate governance and auditing; the role of private equity, financial markets, and takeovers; the efficient determination of leverage, dividends, liquidity, and risk management; and the design of managerial incentive packages. He weaves empirical studies into the book's theoretical analysis. And he places the corporation in its broader environment, both microeconomic and macroeconomic, and examines the two-way interaction between the corporate environment and institutions.

Setting a new milestone in the field, *The Theory of Corporate Finance* will be the authoritative text for years to come.

Hardcover $90.00/£62.00   ISBN: 9780691125565
656 pages. (2005)
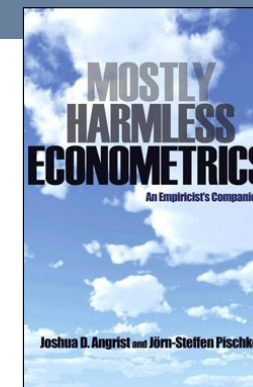
Mostly Harmless Econometrics
An Empiricist's Companion
Joshua D. Angrist, Jörn-Steffen Pischke

http://press.princeton.edu/titles/8769.html

The core methods in today's econometric toolkit are linear regression for statistical control, instrumental variables methods for the analysis of natural experiments, and differences-in-differences methods that exploit policy changes. In the modern experimentalist paradigm, these techniques address clear causal questions such as: Do smaller classes increase learning? Should wife batterers be arrested? How much does education raise wages? *Mostly Harmless Econometrics* shows how the basic tools of applied econometrics allow the data to speak.

In addition to econometric essentials, *Mostly Harmless Econometrics* covers important new extensions--regression-discontinuity designs and quantile regression--as well as how to get standard errors right. Joshua Angrist and Jörn-Steffen Pischke explain why fancier econometric techniques are typically unnecessary and even dangerous. The applied econometric methods emphasized in this book are easy to use and relevant for many areas of contemporary social science.

An irreverent review of econometric essentials

• A focus on tools that applied researchers use most
• Chapters on regression-discontinuity designs, quantile regression, and standard errors
• Many empirical examples
• A clear and concise resource with wide applications
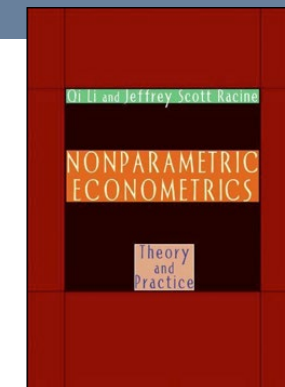
Paperback $42.00/£28.95   ISBN: 9780691120355
392 pages. (2008)

Nonparametric Econometrics
Theory and Practice
Qi Li, Jeffrey Scott Racine

http://press.princeton.edu/titles/8355.html

Until now, students and researchers in nonparametric and semiparametric statistics and econometrics have had to turn to the latest journal articles to keep pace with these emerging methods of economic analysis. Nonparametric Econometrics fills a major gap by gathering together the most up-to-date theory and techniques and presenting them in a remarkably straightforward and accessible format. The empirical tests, data, and exercises included in this textbook help make it the ideal introduction for graduate students and an indispensable resource for researchers.

Nonparametric and semiparametric methods have attracted a great deal of attention from statisticians in recent decades. While the majority of existing books on the subject operate from the presumption that the underlying data is strictly continuous in nature, more often than not social scientists deal with categorical data--nominal and ordinal--in applied settings. The conventional nonparametric approach to dealing with the presence of discrete variables is acknowledged to be unsatisfactory.

This book is tailored to the needs of applied econometricians and social scientists. Qi Li and Jeffrey Racine emphasize nonparametric techniques suited to the rich array of data types--continuous, nominal, and ordinal--within one coherent framework. They also emphasize the properties of nonparametric estimators in the presence of potentially irrelevant variables.

Nonparametric Econometrics covers all the material necessary to understand and apply nonparametric methods for real-world problems.

Hardcover $110.00/£75.00   ISBN: 9780691121611
768 pages. (2006)
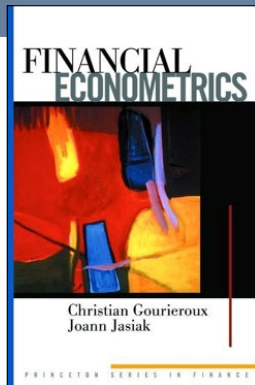
Financial Econometrics
Problems, Models, and Methods
Christian Gourieroux,
Joann Jasiak

http://press.princeton.edu/titles/7226.html

Financial econometrics is a great success story in economics. Econometrics uses data and statistical inference methods, together with structural and descriptive modeling, to address rigorous economic problems. Its development within the world of finance is quite recent and has been paralleled by a fast expansion of financial markets and an increasing variety and complexity of financial products. This has fueled the demand for people with advanced econometrics skills.

For professionals and advanced graduate students pursuing greater expertise in econometric modeling, this is a superb guide to the field's frontier.

This authoritative, state-of-the-art reference text is ideal for upper-level graduate students, researchers, and professionals seeking to update their skills and gain greater facility in using econometric models. All will benefit from the emphasis on practical aspects of financial modeling and statistical inference. Doctoral candidates will appreciate the inclusion of detailed mathematical derivations of the deeper results as well as the more advanced problems concerning high-frequency data and risk control.

By establishing a link between practical questions and the answers provided by financial and statistical theory, the book also addresses the needs of applied researchers employed by financial institutions.

Hardcover $130.00/£90.00   ISBN: 9780691088723
528 pages. (2001)

Econometric Modeling
A Likelihood Approach
David F. Hendry,
Bent Nielsen

http://press.princeton.edu/titles/8352.html
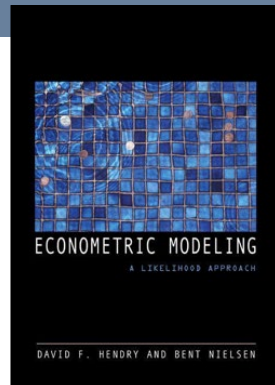
Econometric Modeling provides a new and stimulating introduction to econometrics, focusing on modeling. The key issue confronting empirical economics is to establish sustainable relationships that are both supported by data and interpretable from economic theory. The unified likelihood-based approach of this book gives students the required statistical foundations of estimation and inference, and leads to a thorough understanding of econometric techniques.

David Hendry and Bent Nielsen introduce modeling for a range of situations, including binary data sets, multiple regression, and cointegrated systems. In each setting, a statistical model is constructed to explain the observed variation in the data, with estimation and inference based on the likelihood function. Substantive issues are always addressed, showing how both statistical and economic assumptions can be tested and empirical results interpreted. Important empirical problems such as structural breaks, forecasting, and model selection are covered, and Monte Carlo simulation is explained and applied.

Econometric Modeling is a self-contained introduction for advanced undergraduate or graduate students. Throughout, data illustrate and motivate the approach, and are available for computer-based teaching. Technical issues from probability theory and statistical theory are introduced only as needed. Nevertheless, the approach is rigorous, emphasizing the coherent formulation, estimation, and evaluation of econometric models relevant for empirical research.

Paperback $72.50/£50.00   ISBN: 9780691130897
384 pages. (2007)

Econometrics
Fumio Hayashi

http://press.princeton.edu/titles/6946.html

Hayashi's *Econometrics* promises to be the next great synthesis of modern econometrics. It introduces first year Ph.D. students to standard graduate econometrics material from a modern perspective. It covers all the standard material necessary for understanding the principal techniques of econometrics from ordinary least squares through cointegration. The book is also distinctive in developing both time-series and cross-section analysis fully, giving the reader a unified framework for understanding and integrating results.

Econometrics has many useful features and covers all the important topics in econometrics in a succinct manner. All the estimation techniques that could possibly be taught in a first-year graduate course, except maximum likelihood, are treated as special cases of GMM (generalized methods of moments). Maximum likelihood estimators for a variety of models (such as probit and tobit) are collected in a separate chapter. This arrangement enables students to learn various estimation techniques in an efficient manner. Eight of the ten chapters include a serious empirical application drawn from labor economics, industrial organization, domestic and international finance, and macroeconomics. These empirical exercises at the end of each chapter provide students a hands-on experience applying the techniques covered in the chapter. The exposition is rigorous yet accessible to students who have a working knowledge of very basic linear algebra and probability theory. All the results are stated as propositions, so that students can see the points of the discussion and also the conditions under which those results hold. Most propositions are proved in the text.

For those who intend to write a thesis on applied topics, the empirical applications of the book are a good way to learn how to conduct empirical research. For the theoretically inclined, the no-compromise treatment of the basic techniques is a good preparation for more advanced theory courses.

Hardcover $115.00/£35.00   ISBN: 9780691010182
712 pages. (2000)
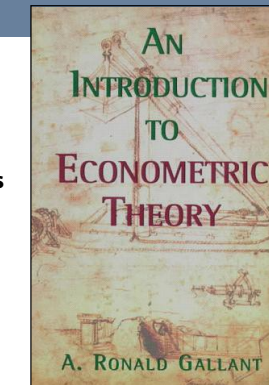
An Introduction to Econometric Theory
Measure-Theoretic Probability and Statistics with Applications to Economics
A. Ronald Gallant

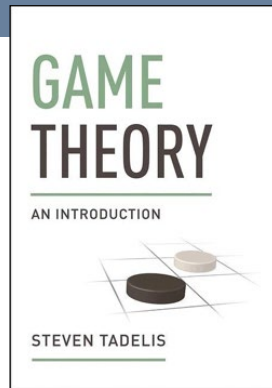http://press.princeton.edu/titles/6216.html

Intended primarily to prepare first-year graduate students for their ongoing work in econometrics, economic theory, and finance, this innovative book presents the fundamental concepts of theoretical econometrics, from measure-theoretic probability to statistics. A. Ronald Gallant covers these topics at an introductory level and develops the ideas to the point where they can be applied. He thereby provides the reader not only with a basic grasp of the key empirical tools but with sound intuition as well.

In addition to covering the basic tools of empirical work in economics and finance, Gallant devotes particular attention to motivating ideas and presenting them as the solution to practical problems. For example, he presents correlation, regression, and conditional expectation as a means of obtaining the best approximation of one random variable by some function of another. He considers linear, polynomial, and unrestricted functions, and leads the reader to the notion of conditioning on a sigma-algebra as a means for finding the unrestricted solution. The reader thus gains an understanding of the relationships among linear, polynomial, and unrestricted solutions. Proofs of results are presented when the proof itself aids understanding or when the proof technique has practical value.

A major text-treatise by one of the leading scholars in this field, *An Introduction to Econometric Theory* will prove valuable not only to graduate students but also to all economists, statisticians, and finance professionals interested in the ideas and implications of theoretical econometrics.

Hardcover $110.00/£75.00   ISBN: 9780691016450
208 pages (1997)

Game Theory
An Introduction
Steven Tadelis

http://press.princeton.edu/titles/10001.html

Game Theory Evolving
A Problem-Centered Introduction to Modeling Strategic Interaction (Second Edition)
Herbert Gintis

http://press.princeton.edu/titles/8900.html

This comprehensive textbook introduces readers to the principal ideas and applications of game theory, in a style that combines rigor with accessibility. Steven Tadelis begins with a concise description of rational decision making, and goes on to discuss strategic and extensive form games with complete information, Bayesian games, and extensive form games with imperfect information. He covers a host of topics, including multistage and repeated games, bargaining theory, auctions, rent-seeking games, mechanism design, signaling games, reputation building, and information transmission games. Unlike other books on game theory, this one begins with the idea of rationality and explores its implications for multiperson decision problems through concepts like dominated strategies and rationalizability. Only then does it present the subject of Nash equilibrium and its derivatives.

Game Theory is the ideal textbook for advanced undergraduate and beginning graduate students. Throughout, concepts and methods are explained using real-world examples backed by precise analytic material. The book features many important applications to economics and political science, as well as numerous exercises that focus on how to formalize informal situations and then analyze them.

• Introduces the core ideas and applications of game theory
• Covers static and dynamic games, with complete and incomplete information
• Features a variety of examples, applications, and exercises
• Topics include repeated games, bargaining, auctions, signaling, reputation, and information transmission
• Ideal for advanced undergraduate and beginning graduate students
• Errata Sheet online
• Student's Solution Manual online
• Instructor Manual, email: beth_clevenger@press.princeton.edu

Hardcover $50.00/£34.95   ISBN: 9780691129082
416 pages. (2012)
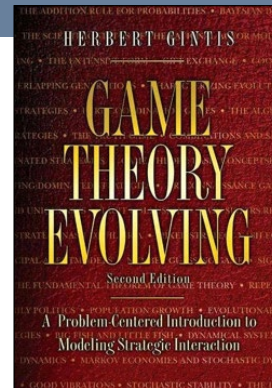
Since its original publication in 2000, *Game Theory Evolving* has been considered the best textbook on evolutionary game theory. This completely revised and updated, second edition of *Game Theory Evolving* contains new material and shows students how to apply game theory to model human behavior in ways that reflect the special nature of sociality and individuality. The textbook continues its in-depth look at cooperation in teams, agent-based simulations, experimental economics, the evolution and diffusion of preferences, and the connection between biology and economics.

Recognizing that students learn by doing, the textbook introduces principles through practice. Herbert Gintis exposes students to the techniques and applications of game theory through a wealth of sophisticated and surprisingly fun-to-solve problems involving human and animal behavior. The second edition includes solutions to the problems presented and information related to agent-based modeling. In addition, the textbook incorporates instruction in using mathematical software to solve complex problems. *Game Theory Evolving* is perfect for graduate and upper-level undergraduate economics students, and is a terrific introduction for ambitious do-it-yourselfers throughout the behavioral sciences.

• Revised and updated edition relevant for courses across disciplines
• Perfect for graduate and upper-level undergraduate economics courses
• Solutions to problems presented throughout
• Incorporates instruction in using computational software for complex problem solving
• Includes in-depth discussions of agent-based modeling

Paperback $46.95/32.95   ISBN: 9780691140513
408 pages. (2009)
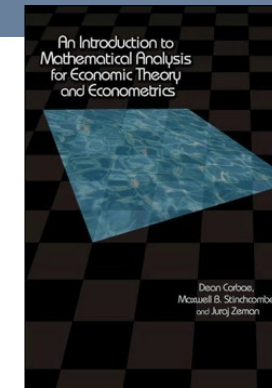
An Introduction to Mathematical Analysis for Economic Theory and Econometrics
Dean Corbae,
Maxwell B. Stinchcombe,
Juraj Zeman

http://press.princeton.edu/titles/8898.html

Exchange-Rate Dynamics
Martin D. D. Evans

http://press.princeton.edu/titles/9475.html

Providing an introduction to mathematical analysis as it applies to economic theory and econometrics, this book bridges the gap that has separated the teaching of basic mathematics for economics and the increasingly advanced mathematics demanded in economics research today. Dean Corbae, Maxwell B. Stinchcombe, and Juraj Zeman equip students with the knowledge of real and functional analysis and measure theory they need to read and do research in economic and econometric theory.

Unlike other mathematics textbooks for economics, *An Introduction to Mathematical Analysis for Economic Theory and Econometrics* takes a unified approach to understanding basic and advanced spaces through the application of the Metric Completion Theorem. This is the concept by which, for example, the real numbers complete the rational numbers and measure spaces complete fields of measurable sets. Another of the book's unique features is its concentration on the mathematical foundations of econometrics. To illustrate difficult concepts, the authors use simple examples drawn from economic theory and econometrics.

Accessible and rigorous, the book is self-contained, providing proofs of theorems and assuming only an undergraduate background in calculus and linear algebra.

• Begins with mathematical analysis and economic examples accessible to advanced undergraduates in order to build intuition for more complex analysis used by graduate students and researchers
• Takes a unified approach to understanding basic and advanced spaces of numbers through application of the Metric Completion Theorem
• Focuses on examples from econometrics to explain topics in measure theory

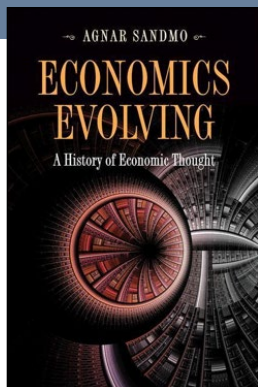Hardcover $95.00/£65.00   ISBN: 9780691118673
696 pages. (2009)
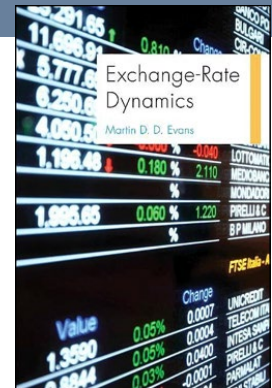
Variations in the foreign exchange market influence all aspects of the world economy, and understanding these dynamics is one of the great challenges of international economics. This book provides a new, comprehensive, and in-depth examination of the standard theories and latest research in exchange-rate economics. Covering a vast swath of theoretical and empirical work, the book explores established theories of exchange-rate determination using macroeconomic fundamentals, and presents unique microbased approaches that combine the insights of microstructure models with the macroeconomic forces driving currency trading.

Macroeconomic models have long assumed that agents—households, firms, financial institutions, and central banks--all have the same information about the structure of the economy and therefore hold the same expectations and uncertainties regarding foreign currency returns. Microbased models, however, look at how heterogeneous information influences the trading decisions of agents and becomes embedded in exchange rates. Replicating key features of actual currency markets, these microbased models generate a rich array of empirical predictions concerning trading patterns and exchange-rate dynamics that are strongly supported by data. The models also show how changing macroeconomic conditions exert an influence on short-term exchange- rate dynamics via their impact on currency trading.

Designed for graduate courses in international macroeconomics, international finance, and finance, and as a go-to reference for researchers in international economics, *Exchange-Rate Dynamics* guides readers through a range of literature on exchange-rate determination, offering fresh insights for further reading and research.

• Comprehensive and in-depth examination of the latest research in exchange-rate economics
• Outlines theoretical and empirical research across the spectrum of modeling approaches
• Presents new results on the importance of currency trading in exchange-rate determination
• Provides new perspectives on long-standing puzzles in exchange-rate economics
• End-of-chapter questions cement key ideas

Hardcover $85.00/£59.00   ISBN: 9780691150895
560 pages. (2011)

Economics Evolving
A History of Economic Thought
Agnar Sandmo

http://press.princeton.edu/titles/9370.html

Unified Growth Theory
Oded Galor

http://press.princeton.edu/titles/9477.html

In clear, nontechnical language, this introductory textbook describes the history of economic thought, focusing on the development of economic theory from Adam Smith's *Wealth of Nations* to the late twentieth century.
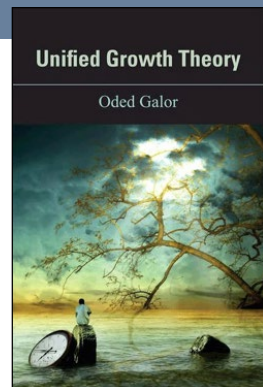
The text concentrates on the most important figures in the history of economics, from Smith, Thomas Robert Malthus, David Ricardo, John Stuart Mill, and Karl Marx in the classical period to John Maynard Keynes and the leading economists of the postwar era, such as John Hicks, Milton Friedman, and Paul Samuelson. It describes the development of theories concerning prices and markets, money and the price level, population and capital accumulation, and the choice between socialism and the market economy. The book examines how important economists have reflected on the sometimes conflicting goals of efficient resource use and socially acceptable income distribution. It also provides sketches of the lives and times of the major economists.

Economics Evolving repeatedly shows how apparently simple ideas that are now taken for granted were at one time at the cutting edge of economics research. For example, the demand curve that today's students probably get to know during their first economics lecture was originally drawn by one of the most innovative theorists in the history of the subject. The book demonstrates not only how the study of economics has progressed over the course of its history, but also that it is still a developing science.

Paperback $46.95/£24.95   ISBN: 9780691148427
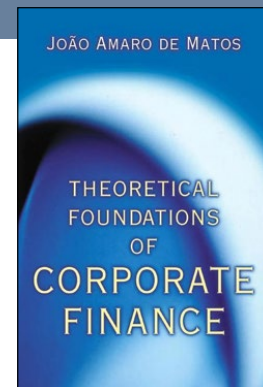504 pages. (2010)

For most of the vast span of human history, economic growth was all but nonexistent. Then, about two centuries ago, some nations began to emerge from this epoch of economic stagnation, experiencing sustained economic growth that led to significant increases in standards of living and profoundly altered the level and distribution of wealth, population, education, and health across the globe. The question ever since has been—why?

This is the first book to put forward a unified theory of economic growth that accounts for the entire growth process, from the dawn of civilization to today. Oded Galor, who founded the field of unified growth theory, identifies the historical and prehistorical forces behind the differential transition timing from stagnation to growth and the emergence of income disparity around the world. Galor shows how the interaction between technological progress and population ultimately raised the importance of education in coping with the rapidly changing technological environment, brought about significant reduction in fertility rates, and enabled some economies to devote greater resources toward a steady increase in per capita income, paving the way for sustained economic growth.

- Presents a unified theory of economic growth from the dawn of civilization to today
- Explains the worldwide disparities in living standards and population we see today
- Provides a comprehensive overview of the three phases of the development process
- Analyzes the Malthusian theory and its empirical support
- Examines theories of demographic transition and their empirical significance
- Explores the interaction between economic development and human evolution

Hardcover $67.50/£46.95   ISBN: 9780691130026
344 pages. (2011)

Theoretical Foundations of Corporate Finance
João Amaro de Matos
http://press.princeton.edu/titles/7224.html

Asset Pricing
(Revised Edition)
John H. Cochrane

http://press.princeton.edu/titles/7836.html

Corporate finance is the area of finance that studies the determinants of firms' values, including capital structure, financing, and investment decisions. Although there are several excellent texts in corporate finance, this is the first to focus on the theoretical foundations of the subject in a consistent and integrated way at the Ph.D. level. In addition to a textbook for advanced graduate students, it can also serve as a general reference to researchers and sophisticated practitioners.

The material presented is carefully selected with an eye to what is essential to understanding the underlying theory, ensuring that this text will remain useful for years to come. The book is divided into three parts. The first section presents the basic principles of valuation based on the absence of arbitrage, including a discussion of the determinants of the optimal capital structure based on the seminal results of Modigliani and Miller. The second section discusses the implications of agency problems and information asymmetries to capital structure, giving particular attention to payout policy and to debt contract design. The concluding portion presents different ways of restructuring capital, including going public, going private using stock repurchases or leveraged buyouts, and mergers and acquisitions. Each chapter includes exercises that vary in difficulty, with suggested solutions provided in an appendix. This book will assuredly be the standard doctoral- and professional-level explication of corporate finance theory and its appropriate applications.

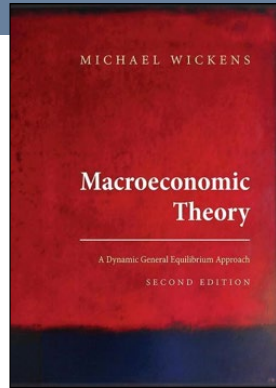Hardcover $95.00/£65.00   ISBN: 9780691087948
320 pages. (2001)
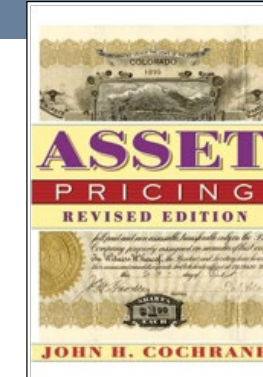
Winner of the prestigious Paul A. Samuelson Award for scholarly writing on lifelong financial security, John Cochrane's *Asset Pricing* now appears in a revised edition that unifies and brings the science of asset pricing up to date for advanced students and professionals. Cochrane traces the pricing of all assets back to a single idea—price equals expected discounted payoff—that captures the macro-economic risks underlying each security's value. By using a single, stochastic discount factor rather than a separate set of tricks for each asset class, Cochrane builds a unified account of modern asset pricing. He presents applications to stocks, bonds, and options. Each model— consumption based, CAPM, multifactor, term structure, and option pricing—is derived as a different specification of the discounted factor.

The discount factor framework also leads to a state-space geometry for mean-variance frontiers and asset pricing models. It puts payoffs in different states of nature on the axes rather than mean and variance of return, leading to a new and conveniently linear geometrical representation of asset pricing ideas.

Cochrane approaches empirical work with the Generalized Method of Moments, which studies sample average prices and discounted payoffs to determine whether price does equal expected discounted payoff. He translates between the discount factor, GMM, and state-space language and the beta, mean-variance, and regression language common in empirical work and earlier theory.

The book also includes a review of recent empirical work on return predictability, value and other puzzles in the cross section, and equity premium puzzles and their resolution. Written to be a for academics and professionals as well as a textbook, this book condenses and advances recent scholarship in financial economics.

Hardcover $110.00/£45.00   ISBN: 9780691121376
560 pages. (2005)

Macroeconomic Theory
A Dynamic General Equilibrium Approach (Second Edition)
Michael Wickens

http://press.princeton.edu/titles/9743.html

The Theory of Incentives
The Principal-Agent Model
Jean-Jacques Laffont, David Martimort

http://press.princeton.edu/titles/7311.html

Macroeconomic Theory is the most up-to-date graduate-level macroeconomics textbook available today. This revised second edition emphasizes the general equilibrium character of macroeconomics to explain effects across the whole economy while taking into account recent research in the field. It is the perfect resource for students and researchers seeking coverage of the most current developments in macroeconomics.

- The most up-to-date graduate macroeconomics textbook available today
- General equilibrium macroeconomics and the latest advances covered fully and completely
- Two new chapters investigate banking and monetary policy, and unemployment
- Addresses questions raised by the recent financial crisis
- Extensive mathematical appendix for at-a-glance easy reference
- Web-based exercises with answers: available online only: Ch. 2-14, First Edition
- An update to "Exercises & Solutions for the Second Edition" is in preparation

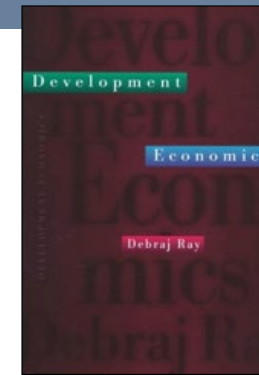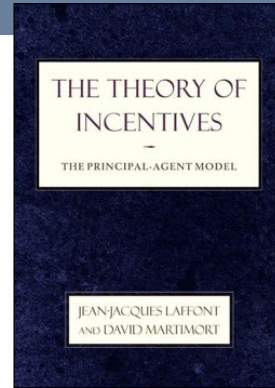Hardcover $75.00/£52.00   ISBN: 9780691152868
616 pages. (2012)

Economics has much to do with incentives—not least, incentives to work hard, to produce quality products, to study, to invest, and to save. Although Adam Smith amply confirmed this more than two hundred years ago in his analysis of sharecropping contracts, only in recent decades has a theory begun to emerge to place the topic at the heart of economic thinking. In this book, Jean-Jacques Laffont and David Martimort present the most thorough yet accessible introduction to incentives theory to date. Central to this theory is a simple question as pivotal to modern-day management as it is to economics research: What makes people act in a particular way in an economic or business situation? In seeking an answer, the authors provide the methodological tools to design institutions that can ensure good incentives for economic agents.

This book focuses on the principal-agent model, the "simple" situation where a principal, or company, delegates a task to a single agent through a contract—the essence of management and contract theory. How does the owner or manager of a firm align the objectives of its various members to maximize profits? Following a brief historical overview showing how the problem of incentives has come to the fore in the past two centuries, the authors devote the bulk of their work to exploring principal-agent models and various extensions thereof in light of three types of information problems: adverse selection, moral hazard, and non-verifiability. Offering an unprecedented look at a subject vital to industrial organization, labor economics, and behavioral economics, this book is set to become the definitive resource for students, researchers, and others who might find themselves pondering what contracts, and the incentives they embody, are really all about.

Paperback $62.95/£27.95   ISBN: 9780691091846
440 pages. (2001)

Development Economics
Debraj Ray

http://press.princeton.edu/titles/6315.html

Introduction to Modern Economic Growth
Daron Acemoglu

http://press.princeton.edu/titles/8764.html

The study of development in low-income countries is attracting more attention around the world than ever before. Yet until now there has been no comprehensive text that incorporates the huge strides made in the subject over the past decade. *Development Economics* does precisely that in a clear, rigorous, and elegant fashion.
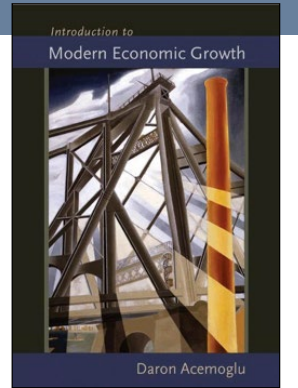
Development Economics will be the definitive textbook in this subject for years to come. It will prove useful to researchers by showing intriguing connections among a wide variety of subjects that are rarely discussed together in the same book. And it will be an important resource for policy-makers, who increasingly find themselves dealing with complex issues of growth, inequality, poverty, and social welfare.

- Teaching instructors only who have adopted *Development Economics:* For end-of-chapter problems, please e-mail the author at: debraj.ray@nyu.edu.
- For more information, please go to http://www.econ.nyu.edu/user/debraj
- If you are a student in the course, please do not contact the author. Please request your instructor to do so.

Hardcover $115.00/£45.00   ISBN: 9780691017068
848 pages (1998)

Introduction to Modern Economic Growth is a groundbreaking text from one of today's leading economists. Daron Acemoglu gives graduate students not only the tools to analyze growth and related macroeconomic problems, but also the broad perspective needed to apply those tools to the big-picture questions of growth and divergence. And he introduces the economic and mathematical foundations of modern growth theory and macroeconomics in a rigorous but easy to follow manner.

After covering the necessary background on dynamic general equilibrium and dynamic optimization, the book presents the basic workhorse models of growth and takes students to the frontier areas of growth theory, including models of human capital, endogenous technological change, technology transfer, international trade, economic development, and political economy. The book integrates these theories with data and shows how theoretical approaches can lead to better perspectives on the fundamental causes of economic growth and the wealth of nations.

Innovative and authoritative, this book is likely to shape how economic growth is taught and learned for years to come.

- Introduces all the foundations for understanding economic growth and dynamic macroeconomic analysis
- Focuses on the big-picture questions of economic growth
- Provides mathematical foundations
- Presents dynamic general equilibrium
- Covers models such as basic Solow, neoclassical growth, and overlapping generations, as well as models of endogenous technology and international linkages
- Addresses frontier research areas such as international linkages, international trade, political economy, and economic development and structural change
- For Professors only: To access a complete solutions manual online, email us at: acemoglusolutions@press.princeton.edu
- Student Solutions Manual containing the answers to selected exercises (978-0-691-14163-3/$24.95), go to: http://press.princeton.edu/titles/8970.html

Hardcover $99.95/£40.00   ISBN: 9780691132921
1008 pages (2008)

Dynamic Asset Pricing Theory, Third Edition
Darrell Duffie

http://press.princeton.edu/titles/7223.html

Credit Risk
Pricing, Measurement, and Management
Darrell Duffie,
Kenneth J. Singleton

http://press.princeton.edu/titles/7520.html

This is a thoroughly updated edition of *Dynamic Asset Pricing Theory*, the standard text for doctoral students and researchers on the theory of asset pricing and portfolio selection in multiperiod settings under uncertainty. The asset pricing results are based on the three increasingly restrictive assumptions: absence of arbitrage, single-agent optimality, and equilibrium. These results are unified with two key concepts, state prices and martingales. Technicalities are given relatively little emphasis, so as to draw connections between these concepts and to make plain the similarities between discrete and continuous-time models.

Readers will be particularly intrigued by this latest edition's most significant new feature: a chapter on corporate securities that offers alternative approaches to the valuation of corporate debt. Also, while much of the continuous-time portion of the theory is based on Brownian motion, this third edition introduces jumps—for example, those associated with Poisson arrivals—in order to accommodate surprise events such as bond defaults. Applications include term-structure models, derivative valuation, and hedging methods. Numerical methods covered include Monte Carlo simulation and finite-difference solutions for partial differential equations. Each chapter provides extensive problem exercises and notes to the literature. A system of appendixes reviews the necessary mathematical concepts. And references have been updated throughout. With this new edition, *Dynamic Asset Pricing Theory* remains at the head of the field.

Hardcover $115.00/£50.00   ISBN: 9780691090221
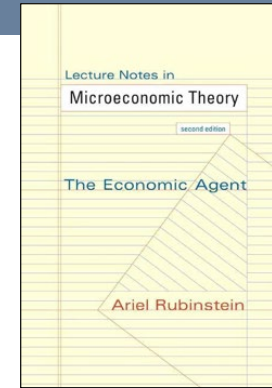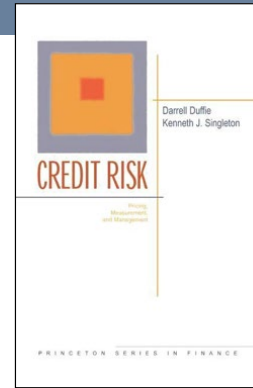488 pages. (2001)

In this book, two of America's leading economists provide the first integrated treatment of the conceptual, practical, and empirical foundations for credit risk pricing and risk measurement. Masterfully applying theory to practice, Darrell Duffie and Kenneth Singleton model credit risk for the purpose of measuring portfolio risk and pricing defaultable bonds, credit derivatives, and other securities exposed to credit risk. The methodological rigor, scope, and sophistication of their state-of-the-art account is unparalleled, and its singularly in-depth treatment of pricing and credit derivatives further illuminates a problem that has drawn much attention in an era when financial institutions the world over are revising their credit management strategies.

Duffie and Singleton offer critical assessments of alternative approaches to credit-risk modeling, while highlighting the strengths and weaknesses of current practice. Their approach blends in-depth discussions of the conceptual foundations of modeling with extensive analyses of the empirical properties of such credit-related time series as default probabilities, recoveries, ratings transitions, and yield spreads. Both the "structura" and "reduced-form" approaches to pricing defaultable securities are presented, and their comparative fits to historical data are assessed. The authors also provide a comprehensive treatment of the pricing of credit derivatives, including credit swaps, collateralized debt obligations, credit guarantees, lines of credit, and spread options. Not least, they describe certain enhancements to current pricing and management practices that, they argue, will better position financial institutions for future changes in the financial markets.

Credit Risk is an indispensable resource for risk managers, traders or regulators dealing with financial products with a significant credit risk component, as well as for academic researchers and students.

Hardcover $115.00/£42.50   ISBN: 9780691090467
416 pages. (2003)

Lecture Notes in Microeconomic Theory
**The Economic Agent
(Second Edition)**
Ariel Rubinstein

http://press.princeton.edu/titles/9742.html

Microeconomic Foundations I
Choice and Competitive Markets
David M. Kreps

http://press.princeton.edu/titles/9890.html

This book presents Ariel Rubinstein's lecture notes for the first part of his well-known graduate course in microeconomics. Developed during the fifteen years that Rubinstein taught the course at Tel Aviv University, Princeton University, and New York University, these notes provide a critical assessment of models of rational economic agents, and are an invaluable supplement to any primary textbook in microeconomic theory.

In this fully revised and expanded second edition, Rubinstein retains the striking originality and deep simplicity that characterize his famously engaging style of teaching. He presents these lecture notes with a precision that gets to the core of the material, and he places special emphasis on the interpretation of key concepts. Rubinstein brings this concise book thoroughly up to date, covering topics like modern choice theory and including dozens of original new problems.
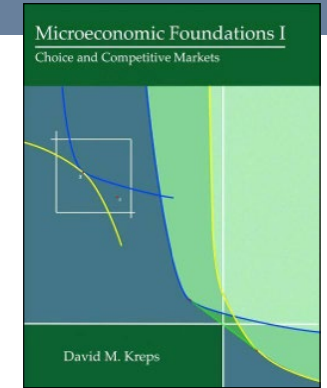
Written by one of the world's most respected and provocative economic theorists, this second edition of *Lecture Notes in Microeconomic Theory* is essential reading for students, teachers, and research economists.

• Fully revised, expanded, and updated
• Retains the engaging style and method of Rubinstein's well-known lectures
• Covers topics like modern choice theory
• Features numerous original new problems—including 21 new review problems
• Solutions manual (available only to teachers) can be found at: http://gametheory.tau.ac.il/microTheory/

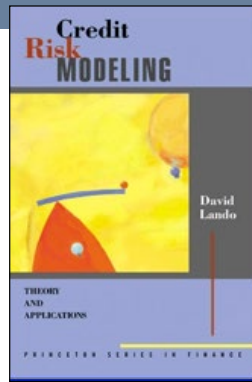Paperback $35.00/£24.95   ISBN: 9780691154138
168 pages. (2012)

Microeconomic Foundations I develops the choice, price, and general equilibrium theory topics typically found in first-year theory sequences, but in deeper and more complete mathematical form than most standard texts provide. The objective is to take the reader from acquaintance with these foundational topics to something closer to mastery of the models and results connected to them.

• Provides a rigorous treatment of some of the basic tools of economic modeling and reasoning, along with an assessment of the strengths and weaknesses of these tools
• Complements standard texts
• Covers choice, preference, and utility; structural properties of preferences and utility functions; basics of consumer demand; revealed preference and Afriat's Theorem; choice under uncertainty; dynamic choice; social choice and efficiency; competitive and profit-maximizing firms; expenditure minimization; demand theory (duality methods); producer and consumer surplus; aggregation; general equilibrium; efficiency and the core; GET, time, and uncertainty; and other topics
• Features a free web-based student's guide, which gives solutions to approximately half the problems, and a limited-access instructor's manual, which provides solutions to the rest of the problems
• Contains appendixes that review most of the specific mathematics employed in the book, including a from-first-principles treatment of dynamic programming
• Instructor's Manual: http://microfoundations1.stanford.edu/instructor
• Students and other readers: http://microfoundations1.stanford.edu/student

Hardcover $39.50/£27.95   ISBN: 9780691155838
584 pages. (2012)

Credit Risk Modeling
Theory and Applications
David Lando

http://press.princeton.
edu/titles/7726.html

International Finance
Theory into Practice
Piet Sercu
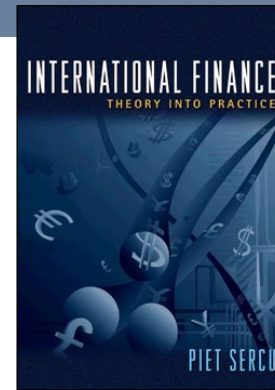
http://press.princeton.
edu/titles/8907.html

Credit risk is today one of the most intensely studied topics in quantitative finance. This book provides an introduction and overview for readers who seek an up-to-date reference to the central problems of the field and to the tools currently used to analyze them. The book is aimed at researchers and students in finance, at quantitative analysts in banks and other financial institutions, and at regulators interested in the modeling aspects of credit risk.

David Lando considers the two broad approaches to credit risk analysis: that based on classical option pricing models on the one hand, and on a direct modeling of the default probability of issuers on the other. He offers insights that can be drawn from each approach and demonstrates that the distinction between the two approaches is not at all clear-cut. The book strikes a fruitful balance between quickly presenting the basic ideas of the models and offering enough detail so readers can derive and implement the models themselves. The discussion of the models and their limitations and five technical appendixes help readers expand and generalize the models themselves or to understand existing generalizations. The book emphasizes models for pricing as well as statistical techniques for estimating their parameters. Applications include rating-based modeling, modeling of dependent defaults, swap- and corporate-yield curve dynamics, credit default swaps, and collateralized debt obligations.

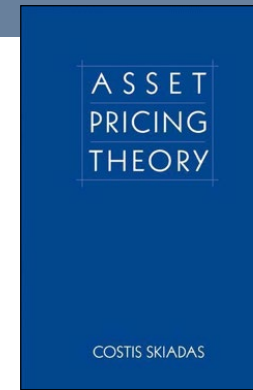Hardcover $110.00/£75.00   ISBN: 9780691089294
328 pages. (2004)

International Finance presents the corporate uses of international financial markets to upper undergraduate and graduate students of business finance and financial economics. Combining practical knowledge, up-to-date theories, and real-world applications, this textbook explores issues of valuation, funding, and risk management. International Finance shows how theoretical applications can be brought into managerial practice.

The text includes an extensive introduction followed by three main sections: currency markets; exchange risk, exposure, and risk management; and long-term international funding and direct investment. Each section begins with a short case study, and each of the sections' chapters concludes with a CFO , examining how a hypothetical chief financial officer might apply topics to a managerial setting. The book also contains end-of-chapter questions to help students grasp the material presented.

Focusing on international markets and multinational corporate finance, International Finance is the go-to resource for students seeking a complete understanding of the field.

- Rigorous focus on international financial markets and corporate finance concepts
- An up-to-date and practice-oriented approach
- Strong real-world examples and applications
- Comprehensive look at valuation, funding, and risk management
- Introductory case studies and "CFO summaries," and end-of-chapter quiz questions
- Lecture Slides
- Source files for some of the lecture slides are available upon request as PDF or LaTeX files. To request materials email: econ_solutions@press.princeton.edu
- On-Line Solutions Manual: Solutions to the quiz questions are available online

Hardcover $105.00/£42.50   ISBN: 9780691136677
832 pages. (2009)

Asset Pricing Theory
Costis Skiadas

http://press.princeton.
edu/titles/8906.html

Real Analysis
with Economic
Applications
Efe A. Ok

http://press.princeton.
edu/titles/8274.html

Asset Pricing Theory is an advanced textbook for doctoral students and researchers that offers a modern introduction to the theoretical and methodological foundations of competitive asset pricing. Costis Skiadas develops in depth the fundamentals of arbitrage pricing, mean-variance analysis, equilibrium pricing, and optimal consumption/portfolio choice in discrete settings, but with emphasis on geometric and martingale methods that facilitate an effortless transition to the more advanced continuous-time theory.

Among the book's many innovations are its use of recursive utility as the benchmark representation of dynamic preferences, and an associated theory of equilibrium pricing and optimal portfolio choice that goes beyond the existing literature.

Asset Pricing Theory is complete with extensive exercises at the end of every chapter and comprehensive mathematical appendixes, making this book a self-contained resource for graduate students and academic researchers, as well as mathematically sophisticated practitioners seeking a deeper understanding of concepts and methods on which practical models are built.

- Covers in depth the modern theoretical foundations of competitive asset pricing and consumption/portfolio choice
- Uses recursive utility as the benchmark preference representation in dynamic settings
- Sets the foundations for advanced modeling using geometric arguments and martingale methodology
- Features self-contained mathematical appendixes
- Includes extensive end-of-chapter exercises

Hardcover $67.50/£46.95   ISBN: 9780691139852
368 pages. (2009)
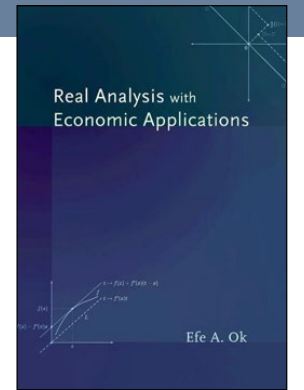
There are many mathematics textbooks on real analysis, but they focus on topics not readily helpful for studying economic theory or they are inaccessible to most graduate students of economics. *Real Analysis with Economic Applications* aims to fill this gap by providing an ideal textbook and reference on real analysis tailored specifically to the concerns of such students.

The emphasis throughout is on topics directly relevant to economic theory. In additionto addressing the usual topics of real analysis, this book discusses the elements of order theory, convex analysis, optimization, correspondences, linear and nonlinear functional analysis, fixed-point theory, dynamic programming, and calculus of variations. Efe Ok complements the mathematical development with applications that provide concise introductions to various topics from economic theory, including individual decision theory and games, welfare economics, information theory, general equilibrium and finance, and intertemporal economics. Moreover, apart from direct applications to economic theory, his book includes numerous fixed point theorems and applications to functional equations and optimization theory.

The book is rigorous, but accessible to those who are relatively new to the ways of real analysis. The formal exposition is accompanied by discussions that describe the basic ideas in relatively heuristic terms, and by more than 1,000 exercises of varying difficulty.

This book will be an indispensable resource in courses on mathematics for economists and as a reference for graduate students working on economic theory.

- Link to errata at http://press.princeton.edu/titles/8274.html

Hardcover $115.00/£80.00   ISBN: 9780691117683
664 pages. (2007)
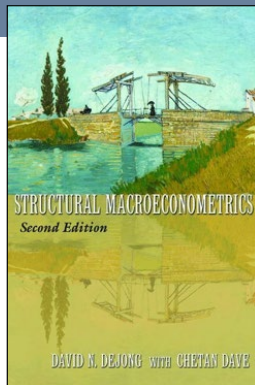
Structural Macroeconometrics
(Second Edition)
David N. DeJong,
Chetan Dave

Structural Macroeconometrics provides a thorough overview and in-depth exploration of methodologies, models, and techniques used to analyze forces shaping national economies. In this thoroughly revised second edition, David DeJong and Chetan Dave emphasize time series econometrics and unite theoretical and empirical research, while taking into account important new advances in the field.

The authors detail strategies for solving dynamic structural models and present the full range of methods for characterizing and evaluating empirical implications, including calibration exercises, method-of-moment procedures, and likelihood-based procedures, both classical and Bayesian. The authors look at recent strides that have been made to enhance numerical efficiency, consider the expanded applicability of dynamic factor models, and examine the use of alternative assumptions involving learning and rational inattention on the part of decision makers. The treatment of methodologies for obtaining nonlinear model representations has been expanded, and linear and nonlinear model representations are integrated throughout the text. The book offers a rich array of implementation algorithms, sample empirical applications, and supporting computer code.

Structural Macroeconometrics is the ideal textbook for graduate students seeking an introduction to macroeconomics and econometrics, and for advanced students pursuing applied research in macroeconomics. The book's historical perspective, along with its broad presentation of alternative methodologies, makes it an indispensable resource for academics and professionals.

Hardcover $60.00/£41.95   ISBN: 9780691152875
440 pages. (2011)

Mathematical Techniques in Finance
Tools for Incomplete Markets
**(Second Edition)**
Ales Cerný
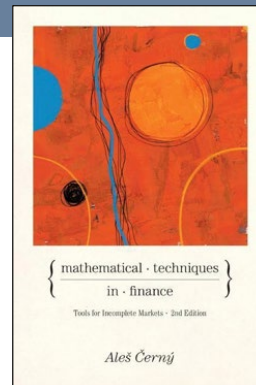
Originally published in 2003, *Mathematical Techniques in Finance* has become a standard textbook for master's-level finance courses containing a significant quantitative element while also being suitable for finance PhD students. This fully revised second edition continues to offer a carefully crafted blend of numerical applications and theoretical grounding in economics, finance, and mathematics, and provides plenty of opportunities for students to practice applied mathematics and cutting-edge finance. Ales Cerný mixes tools from calculus, linear algebra, probability theory, numerical mathematics, and programming to analyze in an accessible way some of the most intriguing problems in financial economics. The textbook is the perfect hands-on introduction to asset pricing, optimal portfolio selection, risk measurement, and investment evaluation.

The new edition includes the most recent research in the area of incomplete markets and unhedgeable risks, adds a chapter on finite difference methods, and thoroughly updates all bibliographic references. Eighty figures, over seventy examples, twenty-five simple ready-to-run computer programs, and several spreadsheets enhance the learning experience. All computer codes have been rewritten using MATLAB and online supplementary materials have been completely updated.

- A standard textbook for graduate finance courses
- Introduction to asset pricing, portfolio selection, risk measurement, and investment evaluation
- Detailed examples and MATLAB codes integrated throughout the text
- Exercises and summaries of main points conclude each chapter

Paperback $72.50/£50.00   ISBN: 9780691141213
416 pages. (2009)
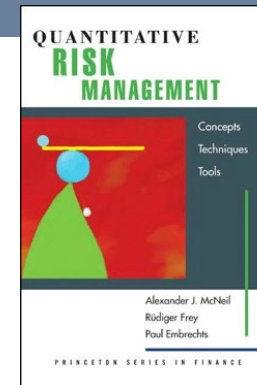
Quantitative Risk Management
Concepts, Techniques, and Tools
Alexander J. McNeil,
Rüdiger Frey, Paul Embrechts

The implementation of sound quantitative risk models is a vital concern for all financial institutions, and this trend has accelerated in recent years with regulatory processes such as Basel II. This book provides a comprehensive treatment of the theoretical concepts and modelling techniques of quantitative risk management and equips readers—whether financial risk analysts, actuaries, regulators, or students of quantitative finance—with practical tools to solve real-world problems. The authors cover methods for market, credit, and operational risk modelling; place standard industry approaches on a more formal footing; and describe recent developments that go beyond, and address main deficiencies of, current practice.

The book's methodology draws on diverse quantitative disciplines, from mathematical finance through statistics and econometrics to actuarial mathematics. Main concepts discussed include loss distributions, risk measures, and risk aggregation and allocation principles. A main theme is the need to satisfactorily address extreme outcomes and the dependence of key risk drivers. The techniques required derive from multivariate statistical analysis, financial time series modelling, copulas, and extreme value theory. A more technical chapter addresses credit derivatives. Based on courses taught to masters students and professionals, this book is a unique and fundamental reference that is set to become a standard in the field.

Hardcover $110.00/£75.00   ISBN: 9780691122557
544 pages. (2005)

The Econometrics of Financial Markets
John Y. Campbell, Andrew W. Lo, A. Craig MacKinlay
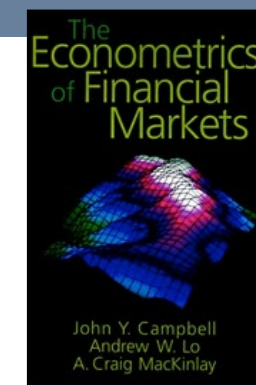
The past twenty years have seen an extraordinary growth in the use of quantitative methods in financial markets. Finance professionals now routinely use sophisticated statistical techniques in portfolio management, proprietary trading, risk management, financial consulting, and securities regulation. This graduate-level textbook is intended for PhD students, advanced MBA students, and industry professionals interested in the econometrics of financial modeling. The book covers the entire spectrum of empirical finance, including: the predictability of asset returns, tests of the Random Walk Hypothesis, the microstructure of securities markets, event analysis, the Capital Asset Pricing Model and the Arbitrage Pricing Theory, the term structure of interest rates, dynamic models of economic equilibrium, and nonlinear financial models such as ARCH, neural networks, statistical fractals, and chaos theory.

Each chapter develops statistical techniques within the context of a particular financial application. This exciting new text contains a unique and accessible combination of theory and practice, bringing state-of-the-art statistical techniques to the forefront of financial applications. Each chapter also includes a discussion of recent empirical evidence, for example, the rejection of the Random Walk Hypothesis, as well as problems designed to help readers incorporate what they have read into their own applications.

Hardcover $110.00/£52.00   ISBN: 9780691043012
632 pages. (1996)
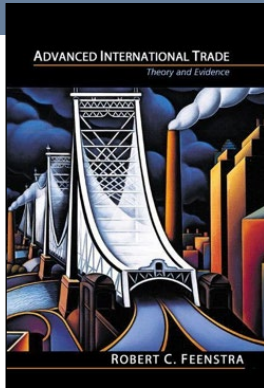
Advanced International Trade
Theory and Evidence
Robert C. Feenstra

http://press.princeton.edu/titles/7608.html

Advanced International Trade is the first major graduate textbook in international trade in a generation. Trade is a cornerstone concept in economics, taught in all departments both in the United States and abroad. The past twenty years have seen a number of new theoretical approaches that are essential to any graduate international trade course, and will be of interest in development economics and other fields. Here, Robert Feenstra steps beyond theory to consider empirical evidence as well. He covers all the basic material including the Ricardian and Hecksher-Ohlin models, extension to many goods and factors, and the role of tariffs, quotas, and other trade policies; recent material including imperfect competition, outsourcing, political economy, multinationals, and endogenous growth; and new material including the gravity equation and the organization of the firm in international trade.

Throughout the book, special emphasis is placed on integrating the theoretical models with empirical evidence, and this is supplemented by theoretical and empirical exercises that appear with each chapter. *Advanced International Trade* is intended to bring readers to the forefront of knowledge in international trade and prepare them to undertake their own research. Both graduate students and faculty will find a wealth of topics that have previously only been covered in journal articles, and are dealt with here in a common and simple notation. In addition to known results, the book includes some particularly important unpublished results by various authors. Two appendices describe empirical methods applicable to research problems in international trade, methods that draw on (i) index numbers and (ii) discrete choice models. Thoroughly up-to-date and marked by clear, straightforward prose, this book will be used widely—and enthusiastically.

Hardcover $110.00/£75.00   ISBN: 9780691114101
496 pages. (2003)

Interest and Prices
Foundations of a Theory of Monetary Policy
Michael Woodford

http://press.princeton.edu/titles/7603.html

With the collapse of the Bretton Woods system, any pretense of a connection of the world's currencies to any real commodity has been abandoned. Yet since the 1980s, most central banks have abandoned money-growth targets as practical guidelines for monetary policy as well. How then can pure "fiat" currencies be managed so as to create confidence in the stability of national units of account?

Interest and Prices seeks to provide theoretical foundations for a rule-based approach to monetary policy suitable for a world of instant communications and ever more efficient financial markets. In such a world, effective monetary policy requires that central banks construct a conscious and articulate account of what they are doing. Michael Woodford reexamines the foundations of monetary economics, and shows how interest-rate policy can be used to achieve an inflation target in the absence of either commodity backing or control of a monetary aggregate.

The book further shows how the tools of modern macroeconomic theory can be used to design an optimal inflation-targeting regime—one that balances stabilization goals with the pursuit of price stability in a way that is grounded in an explicit welfare analysis, and that takes account of the "New Classical" critique of traditional policy evaluation exercises. It thus argues that rule-based policymaking need not mean adherence to a rigid framework unrelated to stabilization objectives for the sake of credibility, while at the same time showing the advantages of rule-based over purely discretionary policymaking.

Hardcover $115.00/£80.00   ISBN: 9780691010496
808 pages. (2003)
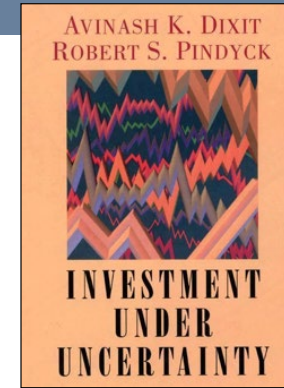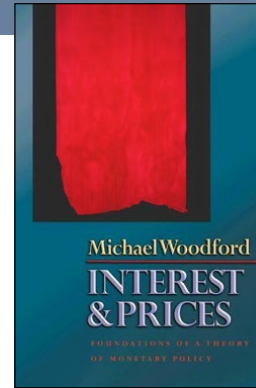
Investment under Uncertainty
Robert K. Dixit,
Robert S. Pindyck

http://press.princeton.edu/titles/5474.html

How should firms decide whether and when to invest in new capital equipment, additions to their workforce, or the development of new products? Why have traditional economic models of investment failed to explain the behavior of investment spending in the United States and other countries? In this book, Avinash Dixit and Robert Pindyck provide the first detailed exposition of a new theoretical approach to the capital investment decisions of firms, stressing the irreversibility of most investment decisions, and the ongoing uncertainty of the economic environment in which these decisions are made. In so doing, they answer important questions about investment decisions and the behavior of investment spending.

This new approach to investment recognizes the option value of waiting for better (but never complete) information. It exploits an analogy with the theory of options in financial markets, which permits a much richer dynamic framework than was possible with the traditional theory of investment. The authors present the new theory in a clear and systematic way, and consolidate, synthesize, and extend the various strands of research that have come out of the theory. Their book shows the importance of the theory for understanding investment behavior of firms; develops the implications of this theory for industry dynamics and for government policy concerning investment; and shows how the theory can be applied to specific industries and to a wide variety of business problems.

Hardcover $105.00/£45.00   ISBN: 9780691034102
476 pages. (1994)

Global Political Economy
Understanding the International Economic Order
Robert Gilpin

http://press.princeton.edu/titles/7093.html

This book is the eagerly awaited successor to Robert Gilpin's 1987 *The Political Economy of International Relations*, the classic statement of the field of international political economy that continues to command the attention of students, researchers, and policymakers. The world economy and political system have changed dramatically since the 1987 book was published. The end of the Cold War has unleashed new economic and political forces, and new regionalisms have emerged. Computing power is increasingly an impetus to the world economy, and technological developments have changed and are changing almost every aspect of contemporary economic affairs. Gilpin's *Global Political Economy* considers each of these developments. Reflecting a lifetime of scholarship, it offers a masterful survey of the approaches that have been used to understand international economic relations and the problems faced in the new economy.

Gilpin focuses on the powerful economic, political, and technological forces that have transformed the world. He gives particular attention to economic globalization, its real and alleged implications for economic affairs, and the degree to which its nature, extent, and significance have been exaggerated and misunderstood. Moreover, he demonstrates that national policies and domestic economies remain the most critical determinants of economic affairs. The book also stresses the importance of economic regionalism, multinational corporations, and financial upheavals.

Gilpin integrates economic and political analysis in his discussion of "global political economy." He employs the conventional theory of international trade, insights from the theory of industrial organization, and endogenous growth theory. In addition, ideas from political science, history, and other disciplines are employed to enrich understanding of the new international economic order. This wide-ranging book is destined to become a landmark in the field.

Paperback $39.95/£27.95   ISBN: 9780691086774
440 pages. (2001)
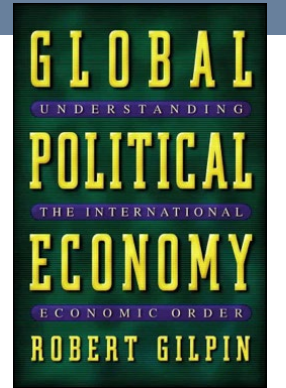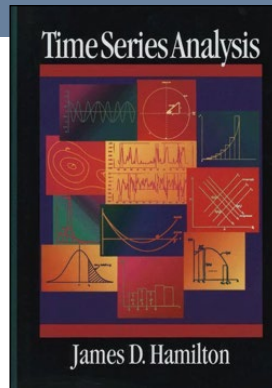
Time Series Analysis
James Douglas Hamilton

The last decade has brought dramatic changes in the way that researchers analyze economic and financial time series. This book synthesizes these recent advances and makes them accessible to first-year graduate students. James Hamilton provides the first adequate text-book treatments of important innovations such as vector autoregressions, generalized method of moments, the economic and statistical consequences of unit roots, time-varying variances, and nonlinear time series models. In addition, he presents basic tools for analyzing dynamic systems (including linear representations, autocovariance generating functions, spectral analysis, and the Kalman filter) in a way that integrates economic theory with the practical difficulties of analyzing and interpreting real-world data. *Time Series Analysis* fills an important need for a textbook that integrates economic theory, econometrics, and new results.

The book is intended to provide students and researchers with a self-contained survey of time series analysis. It starts from first principles and should be readily accessible to any beginning graduate student, while it is also intended to serve as a reference book for researchers.

Hardcover $115.00/£55.00   ISBN: 9780691042893
820 pages. (1994)

Monetary Policy, Inflation, and the Business Cycle
An Introduction to the New Keynesian Framework
Jordi Galí

The New Keynesian framework has emerged as the workhorse for the analysis of monetary policy and its implications for inflation, economic fluctuations, and welfare. It is the backbone of the new generation of medium-scale models under development at major central banks and international policy institutions, and provides the theoretical underpinnings of the inflation stability-oriented strategies adopted by most central banks throughout the industrialized world. This graduate-level textbook provides an introduction to the New Keynesian framework and its applications to monetary policy.

Using a canonical version of the New Keynesian model as a reference framework, Jordi Galí explores issues pertaining to the design of monetary policy, including the determination of the optimal monetary policy and the desirability of simple policy rules. He analyzes several extensions of the baseline model, allowing for cost-push shocks, nominal wage rigidities, and open economy factors. In each case, the implications for monetary policy are addressed, with a special emphasis on the desirability of inflation targeting policies.

- The most up-to-date and accessible introduction to the New Keynesian framework available
- Uses a single benchmark model throughout
- Concise and easy to use
- Includes exercises
- An ideal resource for graduate students, researchers, and market analysts

Hardcover $67.50/£46.95   ISBN: 9780691133164
224 pages. (2008)
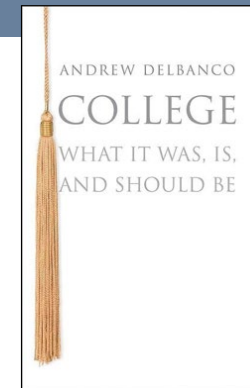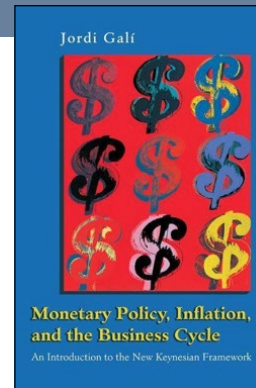
College
What It Was, Is, and Should Be
Andrew Delbanco

As the commercialization of American higher education accelerates, more and more students are coming to college with the narrow aim of obtaining a preprofessional credential. The traditional four-year college experience—an exploratory time for students to discover their passions and test ideas and values with the help of teachers and peers—is in danger of becoming a thing of the past.

In *College*, prominent cultural critic Andrew Delbanco offers a trenchant defense of such an education, and warns that it is becoming a privilege reserved for the relatively rich. In arguing for what a true college education should be, he demonstrates why making it available to as many young people as possible remains central to America's democratic promise.

In a brisk and vivid historical narrative, Delbanco explains how the idea of college arose in the colonial period from the Puritan idea of the gathered church, how it struggled to survive in the nineteenth century in the shadow of the new research universities, and how, in the twentieth century, it slowly opened its doors to women, minorities, and students from low-income families. He describes the unique strengths of America's colleges in our era of globalization and, while recognizing the growing centrality of science, technology, and vocational subjects in the curriculum, he mounts a vigorous defense of a broadly humanistic education for all. Acknowledging the serious financial, intellectual, and ethical challenges that all colleges face today, Delbanco considers what is at stake in the urgent effort to protect these venerable institutions for future generations.
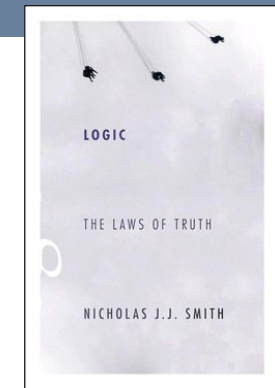
In a new preface, Delbanco addresses recent events that threaten the future of the institution.

- Leading universities and institutions that have ordered this book at: http://press.princeton.edu/titles/9978.html#adoption

Paperback $17.95/£12.50   ISBN: 9780691158297
256 pages. (2013)

The Laws of Truth
Nicholas J.J. Smith

Logic is essential to correct reasoning and also has important theoretical applications in philosophy, computer science, linguistics, and mathematics. This book provides an exceptionally clear introduction to classical logic, with a unique approach that emphasizes both the hows and whys of logic. Here Nicholas Smith thoroughly covers the formal tools and techniques of logic while also imparting a deeper understanding of their underlying rationales and broader philosophical significance. In addition, this is the only introduction to logic available today that presents all the major forms of proof—trees, natural deduction in all its major variants, axiomatic proofs, and sequent calculus. The book also features numerous exercises, with solutions available on an accompanying website.

Logic is the ideal textbook for undergraduates and graduate students seeking a comprehensive and accessible introduction to the subject.

- Provides an essential introduction to classical logic
- Emphasizes the how and why of logic
- Covers both formal and philosophical issues
- Presents all the major forms of proof—from trees to sequent calculus
- Features numerous exercises, with solutions available at http://personal.usyd.edu.au/~njjsmith/lawsoftruth
- The ideal textbook for undergraduates and graduate students

Hardcover $49.50 / £34.95   ISBN: 9780691151632
544 pages. (2012)

First Step
An Elementary Reader for Modern Chinese
Chih-p'ing Chou, Jing Wang & Jun Lei

The Princeton Language Program: Modern Chinese
http://press.princeton.edu/catalogs/series/plpmc.html

First Step is an elementary Chinese textbook for students with no previous background in the language. Focusing on the basics of modern Chinese phonetics and grammatical structure, the book uses everyday topics to help students establish a solid foundation in the Chinese language.

The textbook, which includes color illustrations, contains thirty lessons, each of which can be covered in a week's worth of classes. Each lesson features a lively dialogue or a short essay, representing a real-life situation, which is then followed by vocabulary lists and grammar notes. Explanatory notes on Chinese culture and customs are also provided. The companion workbook for *First Step* is sold separately and includes comprehensive exercises and character writing sheets with information on the stroke orders of newly introduced characters. *First Step* provides students with the necessary tools to begin practical daily communication in Chinese.

- Emphasis is on basic grammar structure and principles
- Textbook features both traditional and simplified characters, pinyin, and English translation
- Perforated workbook (which is sold separately) facilitates easy handling of homework
- Free audio files available online
- Appropriate for college and high school students

Paperback $49.50 ISBN: 9780691154206
352 pages. (Forthcoming 2014)

"I am impressed by this textbook's practical approach, its contemporary and colloquial feel, the variety of exercises included, and the detailed grammatical explanations in each lesson. The authors use current vocabulary and grammatical structures throughout, and their experience shines through. This book is a great addition to the field."
—*Baozhang He, College of the Holy Cross*

"Like all the other Chinese-language textbooks produced over the years by C. P. Chou and his capable colleagues and collaborators, this is a work of extremely high quality. No one in the field of Chinese pedagogy can rival Chou's skill, expertise, and experience. First Step is an outstanding, student-friendly primer of beginning Chinese."
—*James M. Hargett, University at Albany, State University of New York*

First Step
Workbook for Modern Chinese
Chih-p'ing Chou, Jing Wang & Jun Lei

The Princeton Language Program: Modern Chinese
http://press.princeton.edu/catalogs/series/plpmc.html

This workbook is a companion volume to *First Step,* the elementary Chinese textbook. Featuring both traditional and simplified characters along with pinyin and English translation, the workbook includes comprehensive exercises and character writing sheets with information on the stroke orders of newly introduced characters. Perforated pages facilitate student use and easy handling of homework, and the workbook also includes more than 120 color illustrations.

Chih-p'ing Chou is professor of East Asian studies at Princeton University and director of the university's Chinese language and Princeton in Beijing programs. **Jing Wang** is senior lecturer in Chinese at Princeton. **Jun Lei** is a former lecturer in Chinese at Princeton.

Paperback $25.00 ISBN: 9780691159980
304 pages. (Forthcoming 2014)

"An excellent textbook for this level of Chinese instruction, *First Step* reveals the authors' experience, knowledge, and thoroughness in teaching this difficult language."
—*Qiusha Ma, Oberlin College*

"The materials in this book are up-to-date, bold, and lively. Professors, teachers, and instructors will find First Step both useful and a source of inspiration."
—*Yin Chong (Zhuang Yan), Boston University*

The Princeton Language Program: Modern Chinese
http://press.princeton.edu/catalogs/series/plpmc.html
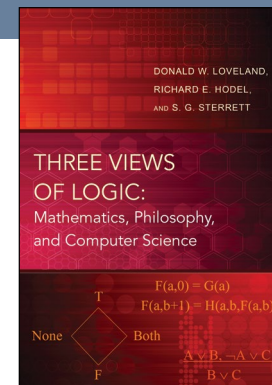
Three Views of Logic
Mathematics, Philosophy, and Computer Science
Donald W. Loveland,
Richard E. Hodel,
S. G. Sterrett

http://press.princeton.edu/titles/10168.html

Demonstrating the different roles that logic plays in the disciplines of computer science, mathematics, and philosophy, this concise undergraduate textbook covers select topics from three different areas of logic: proof theory, computability theory, and nonclassical logic. The book balances accessibility, breadth, and rigor, and is designed so that its materials will fit into a single semester. Its distinctive presentation of traditional logic material will enhance readers' capabilities and mathematical maturity.

The proof theory portion presents classical propositional logic and first-order logic using a computer-oriented (resolution) formal system. Linear resolution and its connection to the programming language Prolog are also treated. The computability component offers a machine model and mathematical model for computation, proves the equivalence of the two approaches, and includes famous decision problems unsolvable by an algorithm. The section on nonclassical logic discusses the shortcomings of classical logic in its treatment of implication and an alternate approach that improves upon it: Anderson and Belnap's relevance logic. Applications are included in each section. The material on a four-valued semantics for relevance logic is presented in textbook form for the first time.

Aimed at upper-level undergraduates of moderate analytical background, *Three Views of Logic* will be useful in a variety of classroom settings.

- Gives an exceptionally broad view of logic
- Treats traditional logic in a modern format
- Presents relevance logic with applications
- Provides an ideal text for a variety of one-semester upper-level undergraduate courses

Hardcover $49.50/£34.95 ISBN: 9780691160443
352 pages. (Forthcoming 2013)

Advances in Analysis
The Legacy of Elias M. Stein
Charles Fefferman,
Alexandru Ionescu,
D. H. Phong &
Stephen Wainger

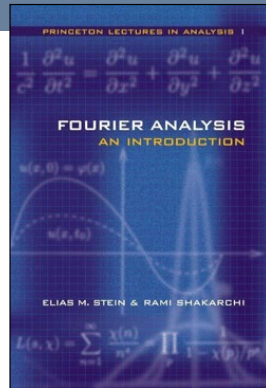http://press.princeton.edu/titles/10166.html
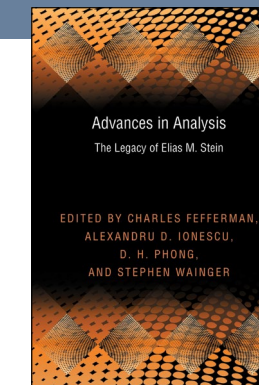
Princeton University's Elias Stein was the first mathematician to see the profound interconnections that tie classical Fourier analysis to several complex variables and representation theory. His fundamental contributions include the Kunze-Stein phenomenon, the construction of new representations, the Stein interpolation theorem, the idea of a restriction theorem for the Fourier transform, and the theory of Hp Spaces in several variables. Through his great discoveries, through books that have set the highest standard for mathematical exposition, and through his influence on his many collaborators and students, Stein has changed mathematics. Drawing inspiration from Stein's contributions to harmonic analysis and related topics, this volume gathers papers from internationally renowned mathematicians, many of whom have been Stein's students. The book also includes expository papers on Stein's work and its influence.

The contributors are Jean Bourgain, Luis Caffarelli, Michael Christ, Guy David, Charles Fefferman, Alexandru D. Ionescu, David Jerison, Carlos Kenig, Sergiu Klainerman, Loredana Lanzani, Sanghy Lee, Lionel Levine, Akos Magyar, Detlef Müller, Camil Muscalu, Alexander Nagel, D. H. Phong, Malabika Pramanik, Andrew S. Raich, Fulvio Ricci, Keith M. Rogers, Andreas Seeger, Scott Sheffield, Luis Silvestre, Christopher D. Sogge, Jacob Sturm, Terence Tao, Christoph Thiele, Stephen Wainger, and Steven Zelditch.

Hardcover $99.50/£69.95 ISBN: 9780691159416
488 pages. (Forthcoming 2014)

Fourier Analysis
An Introduction
Elias M. Stein,
Rami Shakarchi

http://press.princeton.edu/titles/7562.html

Errata

Complex Analysis
Elias M. Stein,
Rami Shakarchi
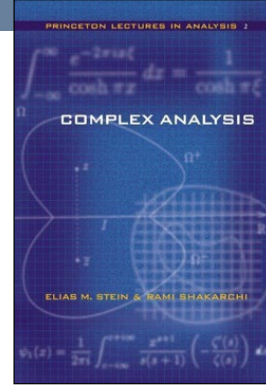
http://press.princeton.edu/titles/7563.html

Errata

This first volume, a three-part introduction to the subject, is intended for students with a beginning knowledge of mathematical analysis who are motivated to discover theideas that shape Fourier analysis. It begins with the simple conviction that Fourier arrived at in the early nineteenth century when studying problems in the physical sciences—that an arbitrary function can be written as an infinite sum of the most basic trigonometric functions.

The first part implements this idea in terms of notions of convergence and summability of Fourier series, while highlighting applications such as the isoperimetric inequality and equidistribution. The second part deals with the Fourier transform and its applications to classical partial differential equations and the Radon transform; a clear introduction to the subject serves to avoid technical difficulties. The book closes with Fourier theory for finite abelian groups, which is applied to prime numbers in arithmetic progression.

In organizing their exposition, the authors have carefully balanced an emphasis on key conceptual insights against the need to provide the technical underpinnings of rigorous analysis. Students of mathematics, physics, engineering and other sciences will find the theory and applications covered in this volume to be of real interest.
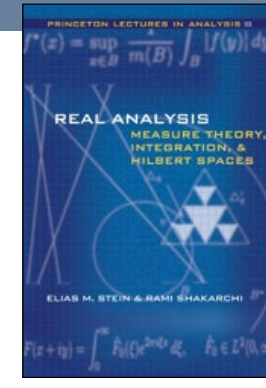
Hardcover $90.00/£62.00   ISBN: 9780691113845
320 pages. (2003)

With this second volume, we enter the intriguing world of complex analysis. From the first theorems on, the elegance and sweep of the results is evident. The starting point is the simple idea of extending a function initially given for real values of the argument to one that is defined when the argument is complex. From there, one proceeds to the main properties of holomorphic functions, whose proofs are generally short and quite illuminating: the Cauchy theorems, residues, analytic continuation, the argument principle.

With this background, the reader is ready to learn a wealth of additional material connecting the subject with other areas of mathematics: the Fourier transform treated by contour integration, the zeta function and the prime number theorem, and an introduction to elliptic functions culminating in their application to combinatorics and number theory.

Thoroughly developing a subject with many ramifications, while striking a careful balance between conceptual insights and the technical underpinnings of rigorous analysis, Complex Analysis will be welcomed by students of mathematics, physics, engineering and other sciences.

Hardcover $90.00/£62.00   ISBN: 9780691113852
400 pages. (2003)

The Princeton Lectures in Analysis represents a sustained effort to introduce the core areas of mathematical analysis while also illustrating the organic unity between them. Numerous examples and applications throughout its four planned volumes, of which Fourier Analysis is the first, highlight the far-reaching consequences of certain ideas in analysis to other fields of mathematics and a variety of sciences. Stein and Shakarchi move from an introduction addressing Fourier series and integrals to in-depth considerations of complex analysis; measure and integration theory, and Hilbert spaces; and, finally, further topics such as functional analysis, distributions and elements of probability theory.

Real Analysis
Measure Theory, Integration, and Hilbert Spaces
Elias M. Stein,
Rami Shakarchi

http://press.princeton.edu/titles/8008.html

Errata

Functional Analysis
Introduction to Further Topics in Analysis
Elias M. Stein,
Rami Shakarchi
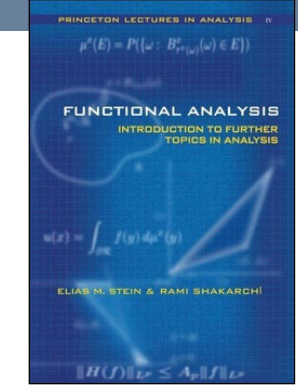
http://press.princeton.edu/titles/9627.html

Real Analysis is the third volume in the Princeton Lectures in Analysis, a series of four textbooks that aim to present, in an integrated manner, the core areas of analysis. Here the focus is on the development of measure and integration theory, differentiation and integration, Hilbert spaces, and Hausdorff measure and fractals. This book reflects the objective of the series as a whole: to make plain the organic unity that exists between the various parts of the subject, and to illustrate the wide applicability of ideas of analysis to other fields of mathematics and science.

After setting forth the basic facts of measure theory, Lebesgue integration, and differentiation on Euclidian spaces, the authors move to the elements of Hilbert space, via the L2 theory. They next present basic illustrations of these concepts from Fourier analysis, partial differential equations, and complex analysis. The final part of the book introduces the reader to the fascinating subject of fractional-dimensional sets, including Hausdorff measure, self-replicating sets, space-filling curves, and Besicovitch sets.

Each chapter has a series of exercises, from the relatively easy to the more complex, that are tied directly to the text. A substantial number of hints encourage the reader to take on even the more challenging exercises.

As with the other volumes in the series, *Real Analysis* is accessible to students interested in such diverse disciplines as mathematics, physics, engineering, and finance, at both the undergraduate and graduate levels.

Hardcover $90.00/£62.00   ISBN: 9780691113869
392 pages. (2005)

This is the fourth and final volume in the Princeton Lectures in Analysis, a series of textbooks that aim to present, in an integrated manner, the core areas of analysis. Beginning with the basic facts of functional analysis, this volume looks at Banach spaces, Lp spaces, and distribution theory, and highlights their roles in harmonic analysis. The authors then use the Baire category theorem to illustrate several points, including the existence of Besicovitch sets. The second half of the book introduces readers to other central topics in analysis, such as probability theory and Brownian motion, which culminates in the solution of Dirichlet's problem. The concluding chapters explore several complex variables and oscillatory integrals in Fourier analysis, and illustrate applications to such diverse areas as nonlinear dispersion equations and the problem of counting lattice points. Throughout the book, the authors focus on key results in each area and stress the organic unity of the subject.

- A comprehensive and authoritative text that treats some of the main topics of modern analysis
- A look at basic functional analysis and its applications in harmonic analysis, probability theory, and several complex variables
- Key results in each area discussed in relation to other areas of mathematics
- Highlights the organic unity of large areas of analysis traditionally split into subfields
- Interesting exercises and problems illustrate ideas
- Clear proofs provided

Hardcover $85.00/£59.00   ISBN: 9780691113876
448 pages. (2011)
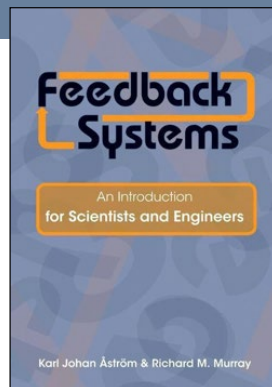
Feedback Systems
An Introduction for Scientists and Engineers
Karl Johan Aström,
Richard M. Murray

http://press.princeton.
edu/titles/9772.html

Validated Numerics
A Short Introduction to Rigorous Computations
Warwick Tucker

http://press.princeton.
edu/titles/9488.html

This book provides an introduction to the mathematics needed to model, analyze, and design feedback systems. It is an ideal textbook for undergraduate and graduate students, and is indispensable for researchers seeking a self-contained reference on control theory. Unlike most books on the subject, *Feedback Systems* develops transfer functions through the exponential response of a system, and is accessible across a range of disciplines that utilize feedback in physical, biological, information, and economic systems.

Karl Åström and Richard Murray use techniques from physics, computer science, and operations research to introduce control-oriented modeling. They begin with state space tools for analysis and design, including stability of solutions, Lyapunov functions, reachability, state feedback observability, and estimators. The matrix exponential plays a central role in the analysis of linear control systems, allowing a concise development of many of the key concepts for this class of models. Åström and Murray then develop and explain tools in the frequency domain, including transfer functions, Nyquist analysis, PID control, frequency domain design, and robustness. They provide exercises at the end of every chapter, and an accompanying electronic solutions manual is available. *Feedback Systems* is a complete one-volume resource for students and researchers in mathematics, engineering, and the sciences.

- Covers the mathematics needed to model, analyze, and design feedback systems
- Serves as an introductory textbook for students and a self-contained resource for researchers
- Includes exercises at the end of every chapter
- Features an electronic solutions manual
- Offers techniques applicable across a range of disciplines

Hardcover $72.50/£50.00   ISBN: 9780691135762
408 pages. (2008)
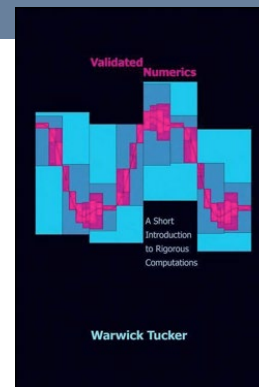
This textbook provides a comprehensive introduction to the theory and practice of validated numerics, an emerging new field that combines the strengths of scientific computing and pure mathematics. In numerous fields ranging from pharmaceutics and engineering to weather prediction and robotics, fast and precise computations are essential. Based on the theory of set-valued analysis, a new suite of numerical methods is developed, producing efficient and reliable solvers for numerous problems in nonlinear analysis. Validated numerics yields rigorous computations that can find all possible solutions to a problem while taking into account all possible sources of error—fast, and with guaranteed accuracy.

Validated Numerics offers a self-contained primer on the subject, guiding readers from the basics to more advanced concepts and techniques. This book is an essential resource for those entering this fast-developing field, and it is also the ideal textbook for graduate students and advanced undergraduates needing an accessible introduction to the subject. Validated Numerics features many examples, exercises, and computer labs using MATLAB/C++, as well as detailed appendixes and an extensive bibliography for further reading.

- Provides a comprehensive, self-contained introduction to validated numerics
- Requires no advanced mathematics or programming skills
- Features many examples, exercises, and computer labs
- Includes code snippets that illustrate implementation
- Suitable as a textbook for graduate students and advanced undergraduates

Hardcover $45.00/£30.95   ISBN: 9780691147819
152 pages. (2011)
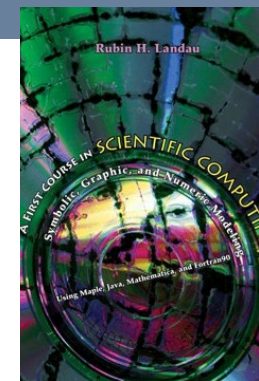
A First Course in Scientific Computing
Symbolic, Graphic, and Numeric Modeling Using Maple, Java, Mathematica, and Fortran90
Rubin H. Landau

http://press.princeton.
edu/titles/7916.html

A Survey of Computational Physics
Introductory Computational Science
Rubin H. Landau,
José Páez,
Cristian C. Bordeianu

http://press.princeton.
edu/titles/8704.html

This book offers a new approach to introductory scientific computing. It aims to make students comfortable using computers to do science, to provide them with the computational tools and knowledge they need throughout their college careers and into their professional careers, and to show how all the pieces can work together. Rubin Landau introduces the requisite mathematics and computer science in the course of realistic problems, from energy use to the building of skyscrapers to projectile motion with drag. He is attentive to how each discipline uses its own language to describe the same concepts and how computations are concrete instances of the abstract.

Landau covers the basics of computation, numerical analysis, and programming from a computational science perspective. The first part of the printed book uses the problem- solving environment Maple as its context, with the same material covered on the accompanying CD as both Maple and Mathematica programs; the second part uses the compiled language Java, with equivalent materials in Fortran90 on the CD; and the final part presents an introduction to LaTeX replete with sample files.

Providing the essentials of computing, with practical examples, *A First Course in Scientific Computing* adheres to the principle that science and engineering students learn computation best while sitting in front of a computer, book in hand, in trial-and- error mode. Not only is it an invaluable learning text and an essential reference for students of mathematics, engineering, physics, and other sciences, but it is also a consummate model for future textbooks in computational science and engineering courses.

- A broad spectrum of computing tools and examples that can be used throughout an academic career
- Practical computing aimed at solving realistic problems
- Both symbolic and numerical computations
- A multidisciplinary approach: science + math + computer science
- Maple and Java in the book itself; Mathematica, Fortran90, Maple and Java on the accompanying CD in an interactive workbook format
- Professors: A Solutions Manual is available from the author at: rubin@science.oregonstate.edu

Hardcover $95.00/£65.00   ISBN: 9780691121833
512 pages. (2005)
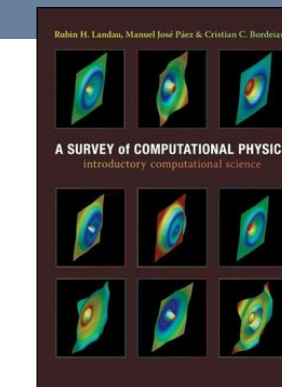
Computational physics is a rapidly growing subfield of computational science, in large part because computers can solve previously intractable problems or simulate natural processes that do not have analytic solutions. The next step beyond Landau's *First Course in Scientific Computing* and a follow-up to Landau and Páez's *Computational Physics*, this text presents a broad survey of key topics in computational physics for advanced undergraduates and beginning graduate students, including new discussions of visualization tools, wavelet analysis, molecular dynamics, and computational fluid dynamics. By treating science, applied mathematics, and computer science together, the book reveals how this knowledge base can be applied to a wider range of real-world problems than computational physics texts normally address.

Designed for a one- or two-semester course, *A Survey of Computational Physics* will also interest anyone who wants a reference on or practical experience in the basics of computational physics. The text includes a CD-ROM with supplementary materials, including Java, Fortran, and C programs; animations; visualizations; color figures; interactive Java applets; codes for MPI, PVM, and OpenDX; and a PVM tutorial.

- Accessible to advanced undergraduates
- Real-world problem-solving approach
- Java codes and applets integrated with text
- Accompanying CD-ROM contains codes, applets, animations, and visualization files
- Companion Web site includes videos of lectures

Hardcover $99.95/£69.95   ISBN: 9780691131375
688 pages. (2008)
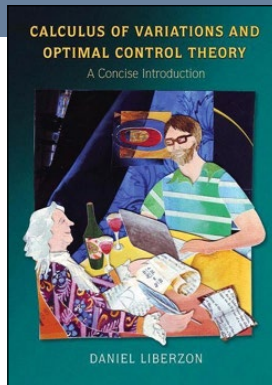
Calculus of Variations and Optimal Control Theory
A Concise Introduction
Daniel Liberzon

http://press.princeton.
edu/titles/9760.html

This textbook offers a concise yet rigorous introduction to calculus of variations and optimal control theory, and is a self-contained resource for graduate students in engineering, applied mathematics, and related subjects. Designed specifically for a one- semester course, the book begins with calculus of variations, preparing the ground for optimal control. It then gives a complete proof of the maximum principle and covers key topics such as the Hamilton-Jacobi-Bellman theory of dynamic programming and linear- quadratic optimal control.

Calculus of Variations and Optimal Control Theory also traces the historical development of the subject and features numerous exercises, notes and references at the end of each chapter, and suggestions for further study.

- Offers a concise yet rigorous introduction
- Requires limited background in control theory or advanced mathematics
- Provides a complete proof of the maximum principle
- Uses consistent notation in the exposition of classical and modern topics
- Traces the historical development of the subject
- Professors: A supplementary Solutions Manual is available for this book. It is restricted to teachers using the text in courses. For information on how to obtain a copy, refer to:
  http://press.princeton.edu/class_use/solutions.html

Hardcover $75.00/£52.00   ISBN: 9780691151878
256 pages. (2011)

Numerical Analysis
L. Ridgway Scott

http://press.princeton.
edu/titles/9487.html
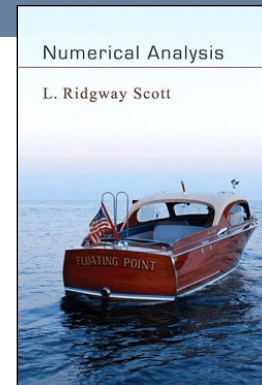
Computational science is fundamentally changing how technological questions are addressed. The design of aircraft, automobiles, and even racing sailboats is now done by computational simulation. The mathematical foundation of this new approach is numerical analysis, which studies algorithms for computing expressions defined with real numbers. Emphasizing the theory behind the computation, this book provides a rigorous and self- contained introduction to numerical analysis and presents the advanced mathematics that underpin industrial software, including complete details that are missing from most textbooks.

Using an inquiry-based learning approach, *Numerical Analysis* is written in a narrative style, provides historical background, and includes many of the proofs and technical details in exercises. Students will be able to go beyond an elementary understanding of numerical simulation and develop deep insights into the foundations of the subject. They will no longer have to accept the mathematical gaps that exist in current textbooks. For example, both necessary and sufficient conditions for convergence of basic iterative methods are covered, and proofs are given in full generality, not just based on special cases.

The book is accessible to undergraduate mathematics majors as well as computational scientists wanting to learn the foundations of the subject.

- Presents the mathematical foundations of numerical analysis
- Explains the mathematical details behind simulation software
- Introduces many advanced concepts in modern analysis
- Self-contained and mathematically rigorous
- Contains problems and solutions in each chapter
- Excellent follow-up course to *Principles of Mathematical Analysis* by Rudin

Hardcover $78.50/£55.00   ISBN: 9780691146867
344 pages. (2011)
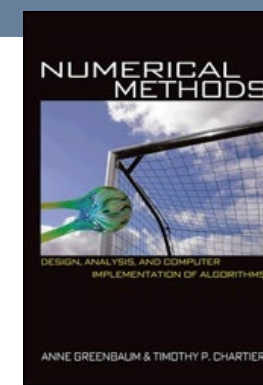
Numerical Methods
Design, Analysis, and Computer Implementation of Algorithms
Anne Greenbaum,
Timothy P. Chartier

http://press.princeton.
edu/titles/9763.html

Numerical Methods provides a clear and concise exploration of standard numerical analysis topics, as well as nontraditional ones, including mathematical modeling, Monte Carlo methods, Markov chains, and fractals. Filled with appealing examples that will motivate students, the textbook considers modern application areas, such as information retrieval and animation, and classical topics from physics and engineering. Exercises use MATLAB and promote understanding of computational results.

The book gives instructors the flexibility to emphasize different aspects—design, analysis, or computer implementation—of numerical algorithms, depending on the background and interests of students. Designed for upper-division undergraduates in mathematics or computer science classes, the textbook assumes that students have prior knowledge of linear algebra and calculus, although these topics are reviewed in the text. Short discussions of the history of numerical methods are interspersed throughout the chapters. The book also includes polynomial interpolation at Chebyshev points, use of the MATLAB package Chebfun, and a section on the fast Fourier transform.

- Clear, concise exposition of standard numerical analysis topics
- Explores nontraditional topics, such as mathematical modeling and Monte Carlo methods
- Covers modern applications, including information retrieval and animation, and classical applications from physics and engineering
- Promotes understanding of computational results through MATLAB exercises
- Provides flexibility so instructors can emphasize mathematical or applied/computational aspects of numerical methods or a combination
- Includes recent results on polynomial interpolation at Chebyshev points and use of the MATLAB package Chebfun
- For supplementary materials, visit:
  http://academics.davidson.edu/math/chartier/Numerical/
- Professors: An electronic version of a supplementary Solutions Manual is available for this book. It is restricted to teachers using the text in courses. To obtain a complimentary copy, email: Vickie_Kearn@press.princeton.edu

Hardcover $95.00/£65.00   ISBN: 9780691151229
472 pages. (2012)

Discrete and Computational Geometry
Satyan L. Devadoss,
Joseph O'Rourke

http://press.princeton.
edu/titles/9489.html
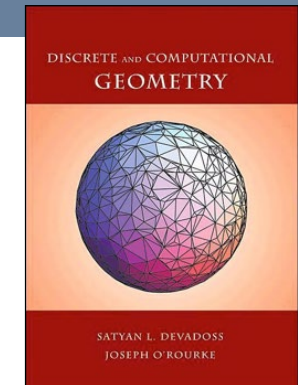
Discrete geometry is a relatively new development in pure mathematics, while computational geometry is an emerging area in applications-driven computer science. Their intermingling has yielded exciting advances in recent years, yet what has been lacking until now is an undergraduate textbook that bridges the gap between the two. *Discrete and Computational Geometry* offers a comprehensive yet accessible introduction to this cutting-edge frontier of mathematics and computer science.

This book covers traditional topics such as convex hulls, triangulations, and Voronoi diagrams, as well as more recent subjects like pseudotriangulations, curve reconstruction, and locked chains. It also touches on more advanced material, including Dehn invariants, associahedra, quasigeodesics, Morse theory, and the recent resolution of the Poincar conjecture. Connections to real-world applications are made throughout, and algorithms are presented independently of any programming language. This richly illustrated textbook also features numerous exercises and unsolved problems.

- The essential introduction to discrete and computational geometry
- Covers traditional topics as well as new and advanced material
- Features numerous full-color illustrations, exercises, and unsolved problems
- Suitable for sophomores in mathematics, computer science, engineering, or physics
- Rigorous but accessible
- An online solutions manual is available (for teachers only). To obtain access, please e-mail:
  Vickie_Kearn@press.princeton.edu
- Errata and Illustrations available online at:
  http://press.princeton.edu/titles/9489.html

Hardcover $65.00/£44.95   ISBN: 9780691145532
272 pages. (2011)

Number Theory
A Historical Approach
John J. Watkins

http://press.princeton.edu/titles/10165.html

"I know of no other book at this easily accessible level that combines extensive coverage of the mathematics with so many interesting biographical facts and anecdotes."
—*Thomas W. Cusick, University at Buffalo, State University of New York*

"This is a very nice introductory text on number theory. It has a good selection of topics, lots of nice history, and many exercises. There is a lot to like here."—*David A. Cox, Amherst College*

"Watkins has advanced an outstanding and engaging treatise on the elementary theory of numbers. I expect it to be extremely valuable in inspiring young minds to think deeply about mathematics, and intend to use this text in my own courses on the topic."—*Alex Kontorovich, Yale University*

The natural numbers have been studied for thousands of years, yet most undergraduate textbooks present number theory as a long list of theorems with little mention of how these results were discovered or why they are important. This book emphasizes the historical development of number theory, describing methods, theorems, and proofs in the contexts in which they originated, and providing an accessible introduction to one of the most fascinating subjects in mathematics.

Written in an informal style by an award-winning teacher, *Number Theory* covers prime numbers, Fibonacci numbers, and a host of other essential topics in number theory, while also telling the stories of the great mathematicians behind these developments, including Euclid, Carl Friedrich Gauss, and Sophie Germain. This one-of-a-kind introductory textbook features an extensive set of problems that enable students to actively reinforce and extend their understanding of the material, as well as fully worked solutions for many of these problems. It also includes helpful hints for when students are unsure of how to get started on a given problem.

- Uses a unique historical approach to teaching number theory
- Features numerous problems, helpful hints, and fully worked solutions
- Discusses fun topics like Pythagorean tuning in music, Sudoku puzzles, and arithmetic progressions of primes
- Includes an introduction to Sage, an easy-to-learn yet powerful open-source mathematics software package
- Ideal for undergraduate mathematics majors as well as non-math majors
- Digital solutions manual (available only to professors)

Hardcover $75.00/£52.00   ISBN: 9780691159409
504 pages (Forthcoming 2013)
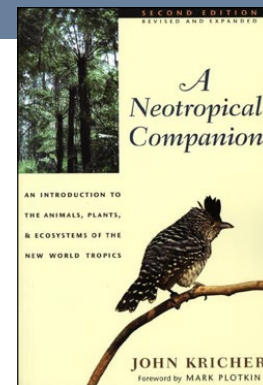
A Neotropical Companion
An Introduction to the Animals, Plants, and Ecosystems of the New World Tropics (Second edition, revised and expanded)
John Kricher
Foreword by Mark Plotkin

http://press.princeton.edu/titles/6179.html

A Neotropical Companion is an extraordinarily readable introduction to the American tropics, the lands of Central and South America, their remarkable rainforests and other ecosystems, and the creatures that live there. It is the most comprehensive one- volume guide to the Neotropics available today. Widely praised in its first edition, it remains a book of unparalleled value to tourists, students, and scientists alike. This second edition has been substantially revised and expanded to incorporate the abundance of new scientific information that has been produced since it was first published in 1989. Major additions have been made to every chapter, and new chapters have been added on Neotropical ecosystems, human ecology, and the effects of deforestation. Biodiversity and its preservation are discussed throughout the book, and Neotropical evolution is described in detail. This new edition offers all new drawings and photographs, many of them in color.

As enthusiastic readers of the first edition will attest, this is a charming book. Wearing his learning lightly and writing with ease and humor, John Kricher presents the complexities of tropical ecology as accessible and nonintimidating. Kricher is so thoroughly knowledgeable and the book is so complete in its coverage that general readers and ecotourists will not need any other book to help them identify and understand the plants and animals, from birds to bugs, that they will encounter in their travels to the New World tropics. At the same time, it will fascinate armchair travelers and students who may get no closer to the Neotropics than this engagingly written book.

Paperback $39.95/£27.95   ISBN: 9780691009742
504 pages. (1999)

Tropical Ecology
John Kricher

http://press.princeton.edu/titles/9486.html
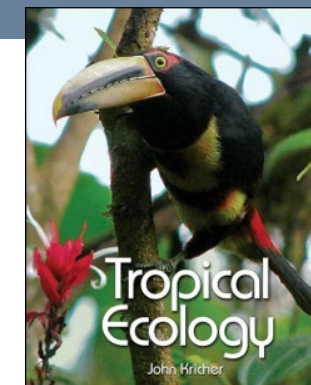
This full-color illustrated textbook offers the first comprehensive introduction to all major aspects of tropical ecology. It explains why the world's tropical rain forests are so universally rich in species, what factors may contribute to high species richness, how nutrient cycles affect rain forest ecology, and how ecologists investigate the complex interrelationships among flora and fauna. It covers tropical montane ecology, riverine ecosystems, savanna, dry forest—and more.
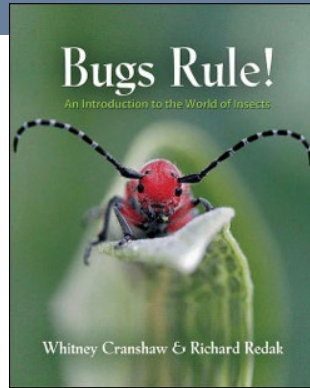
Tropical Ecology begins with a historical overview followed by a sweeping discussion of biogeography and evolution, and then introduces students to the unique and complex structure of tropical rain forests. Other topics include the processes that influence everything from species richness to rates of photosynthesis: how global climate change may affect rain forest characteristics and function; how fragmentation of ecosystems affects species richness and ecological processes; human ecology in the tropics; biodiversity; and conservation of tropical ecosystems and species.

Drawing on real-world examples taken from actual research, *Tropical Ecology* is the best textbook on the subject for advanced undergraduates and graduate students.

- Offers the first comprehensive introduction to tropical ecology
- Describes all the major kinds of tropical terrestrial ecosystems
- Explains species diversity, evolutionary processes, and coevolutionary interactions
- Features numerous color illustrations and examples from actual research
- Covers global warming, deforestation, reforestation, fragmentation, and conservation
- The essential textbook for advanced undergraduates and graduate students
- Suitable for courses with a field component
- Slides to accompany each chapter:
  http://press.princeton.edu/titles/9486.html

Hardcover $99.95/£69.95   ISBN: 9780691115139
630 pages. (2011)

Bugs Rule!
An Introduction to the World of Insects
Whitney Cranshaw, Richard Redak

http://press.princeton.edu/titles/10163.html

Garden Insects of North America
The Ultimate Guide to Backyard Bugs
Whitney Cranshaw

http://press.princeton.edu/titles/7713.html

Bugs Rule! provides a lively introduction to the biology and natural history of insects and their noninsect cousins, such as spiders, scorpions, and centipedes. This richly illustrated textbook features more than 830 color photos, a concise overview of the basics of entomology, and numerous sidebars that highlight and explain key points. Detailed chapters cover each of the major insect groups, describing their physiology, behaviors, feeding habits, reproduction, human interactions, and more.

Ideal for nonscience majors and anyone seeking to learn more about insects and their arthropod relatives, *Bugs Rule!* offers a one-of-a-kind gateway into the world of these amazing creatures.
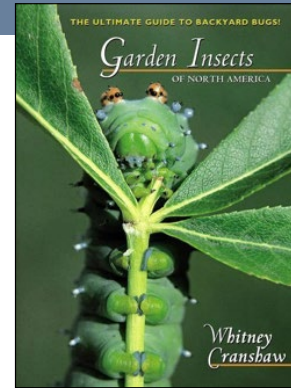
- Places a greater emphasis on natural history than standard textbooks on the subject
- Covers the biology and natural history of all the insect orders
- Provides a thorough review of the noninsect arthropods, such as spiders, scorpions, centipedes, millipedes, and crustaceans
- Features more than 830 color photos
- Highlights the importance of insects and other arthropods, including their impact on human society
- Illustration package:
  http://press.princeton.edu/titles/10163.html

Hardcover $55.00/£37.95   ISBN: 9780691124957
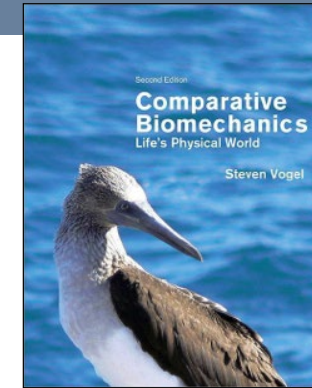496 pages. (2013)

Garden Insects of North America is the most comprehensive and user-friendly guide to the common insects and mites affecting yard and garden plants in North America. In a manner no previous book has come close to achieving, through full-color photos and concise, clear, scientifically accurate text, it describes the vast majority of species associated with shade trees and shrubs, turfgrass, flowers and ornamental plants, vegetables, and fruits—1,420 of them, including crickets, katydids, fruit flies, mealybugs, moths, maggots, borers, aphids, ants, bees, and many, many more. For particularly abundant bugs adept at damaging garden plants, management tips are also included. Covering all of the continental United States and Canada, this is the definitive one-volume resource for amateur gardeners, insect lovers, and professional entomologists alike.

Whether managing, studying, or simply observing insects, identification is the first step--and this book is the key. With it in hand, the marvelous microcosm right outside the house finally comes fully into view.

- Describes more than 1,400 species—twice as many as in any other field guide
- Full-color photos for most species—more than five times the number in most comparable guides
- Up-to-date pest management tips
- Organized by plant area affected and by taxa for easy identification
- Covers the continental United States and Canada
- Provides species level treatment of all insects and mites important to gardens
- Illustrates all life stages of key garden insects and commonly associated plant injuries
- Concise, clear, scientifically accurate text
- Comprehensive and user-friendly

Paperback $29.95/£19.95   ISBN: 9780691095615
672 pages. (2004)

Comparative Biomechanics
Life's Physical World (Second Edition)
Steven Vogel

http://press.princeton.edu/titles/10046.html

Developmental Neuroscience
A Concise Introduction
Susan E. Fahrbach

http://press.princeton.edu/titles/10162.html

Why do you switch from walking to running at a specific speed? Why do tall trees rarely blow over in high winds? And why does a spore ejected into air at seventy miles per hour travel only a fraction of an inch? *Comparative Biomechanics* is the first and only textbook that takes a comprehensive look at the mechanical aspects of life—covering animals and plants, structure and movement, and solids and fluids. An ideal entry point into the ways living creatures interact with their immediate physical world, this revised and updated edition examines how the forms and activities of animals and plants reflect the materials available to nature, considers rules for fluid flow and structural design, and explores how organisms contend with environmental forces.

Drawing on physics and mechanical engineering, Steven Vogel looks at how animals swim and fly, modes of terrestrial locomotion, organism responses to winds and water currents, circulatory and suspension-feeding systems, and the relationship between size and mechanical design. He also investigates links between the properties of biological materials—such as spider silk, jellyfish jelly, and muscle—and their structural and functional roles. Early chapters and appendices introduce relevant physical variables for quantification, and problem sets are provided at the end of each chapter. *Comparative Biomechanics* is useful for physical scientists and engineers seeking a guide to state-of- the-art biomechanics. For a wider audience, the textbook establishes the basic biological context for applied areas—including ergonomics, orthopedics, mechanical prosthetics, kinesiology, sports medicine, and biomimetics—and provides materials for exhibit designers at science museums.

- Instructional materials available. See more online.
- Problem sets at the ends of chapters
- Appendices cover basic background information
- Updated and expanded documentation and materials
- Revised figures and text
- Increased coverage of friction, viscoelastic materials, surface tension, diverse modes of locomotion, and biomimetics

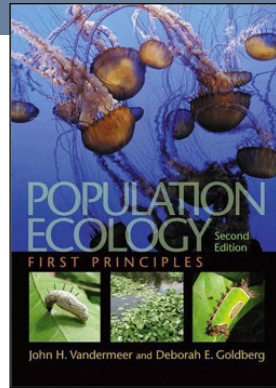Hardcover $99.50/£69.95   ISBN: 9780691155661
640 pages. (2013)
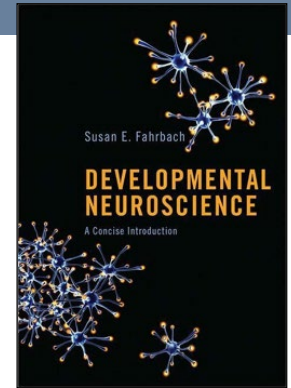
This textbook offers a concise introduction to the exciting field of developmental neuroscience, a discipline concerned with the mechanisms by which complex nervous systems emerge during embryonic growth. Bridging the divide between basic and clinical research, it captures the extraordinary progress that has been achieved in the field. It provides an opportunity for students to apply and extend what they have learned in their introductory biology courses while also directing them to the primary literature.

This accessible textbook is unique in that it takes an in-depth look at a small number of key model systems and signaling pathways. The book's chapters logically follow the sequence of human brain development and explain how information obtained from models such as Drosophila and zebrafish addresses topics relevant to this area. Beginning with a brief presentation of methods for studying neural development, the book provides an overview of human development, followed by an introduction to animal models. Subsequent chapters consider the molecular mechanisms of selected earlier and later events, neurogenesis, and formation of synapses. Glial cells and postembryonic maturation of the nervous system round out later chapters. The book concludes by discussing the brain basis of human intellectual disabilities viewed from a developmental perspective.

Focusing on the mechanistic and functional, this textbook will be invaluable to biology majors, neuroscience students, and premedical and pre-health-professions students.

- An accessible introduction to nervous system development
- Suitable for one-semester developmental neuroscience course
- Thorough review of key model systems
- Selective coverage of topics allows professors to personalize courses
- Investigative reading exercises at the end of each chapter
- Illustration package online at:
  http://press.princeton.edu/titles/10162.html
- Susan E. Fahrbach's Home Page at:
  http://college.wfu.edu/biolab/fahrbach/

Hardcover $75.00/£52.00   ISBN: 9780691150987
320 pages. (2013)

Population Ecology
**First Principles
(Second Edition)**
John H. Vandermeer,
Deborah E. Goldberg

http://press.princeton.
edu/titles/10164.html

Agent-Based and
Individual-Based
Modeling
A Practical Introduction
Steven F. Railsback,
Volker Grimm

http://press.princeton.
edu/titles/9639.html

Ecology is capturing the popular imagination like never before, with issues such as climate change, species extinctions, and habitat destruction becoming ever more prominent. At the same time, the science of ecology has advanced dramatically, growing in mathematical and theoretical sophistication. Here, two leading experts present the fundamental quantitative principles of ecology in an accessible yet rigorous way, introducing students to the most basic of all ecological subjects, the structure and dynamics of populations.

John Vandermeer and Deborah Goldberg show that populations are more than simply collections of individuals. Complex variables such as distribution and territory for expanding groups come into play when mathematical models are applied. Vandermeer and Goldberg build these models from the ground up, from first principles, using a broad range of empirical examples, from animals and viruses to plants and humans. They address a host of exciting topics along the way, including age-structured populations, spatially distributed populations, and metapopulations.

This second edition of *Population Ecology* is fully updated and expanded, with additional exercises in virtually every chapter, making it the most up-to-date and comprehensive textbook of its kind.

- Provides an accessible mathematical foundation for the latest advances in ecology
- Features numerous exercises and examples throughout
- Introduces students to the key literature in the field
- The essential textbook for advanced undergraduates and graduate students
- An online illustration package is available to professors:
  http://press.princeton.edu/titles/10164.html

Paperback $75.00/£52.00   ISBN: 9780691160313
288 pages. (2013)

Agent-based modeling is a new technique for understanding how the dynamics of biological, social, and other complex systems arise from the characteristics and behaviors of the agents making up these systems. This innovative textbook gives students and scientists the skills to design, implement, and analyze agent-based models. It starts with the fundamentals of modeling and provides an introduction to NetLogo, an easy-to-use, free, and powerful software platform. Nine chapters then each introduce an important modeling concept and show how to implement it using NetLogo. The book goes on to present strategies for finding the right level of model complexity and developing theory for agent behavior, and for analyzing and learning from models.

Agent-Based and Individual-Based Modeling features concise and accessible text, numerous examples, and exercises using small but scientific models. The emphasis throughout is on analysis—such as software testing, theory development, robustness analysis, and understanding full models—and on design issues like optimizing model structure and finding good parameter values.

- The first hands-on introduction to agent-based modeling, from conceptual design to computer implementation to parameterization and analysis
- Provides an introduction to NetLogo with nine chapters introducing an important modeling concept and showing how to implement it using NetLogo
- Filled with examples and exercises, with updates and supplementary materials at
  http://www.railsback-grimm-abm-book.com/
- Designed for students and researchers across the biological and social sciences
- Written by leading practitioners

Paperback $55.00/£37.95   ISBN: 9780691136745
352 pages. (2011)
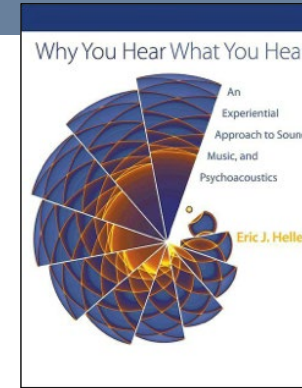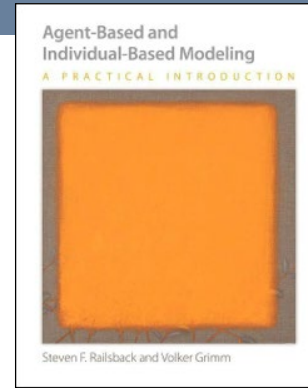
Why You Hear What
You Hear
**An Experiential Approach
to Sound, Music, and
Psychoacoustics**
Eric J. Heller

http://press.princeton.
edu/titles/9912.html

Biophysics
Searching for Principles
William Bialek

http://press.princeton.
edu/titles/9911.html

Why You Hear What You Hear is the first book on the physics of sound for the nonspecialist to empower readers with a hands-on, ears-open approach that includes production, analysis, and perception of sound. The book makes possible a deep intuitive understanding of many aspects of sound, as opposed to the usual approach of mere description. This goal is aided by hundreds of original illustrations and examples, many of which the reader can reproduce and adjust using the same tools used by the author (e.g., very accessible applets for PC and Mac, and interactive web-based examples, simulations, and analysis tools will be found on the book's website: whyyouhearwhatyouhear.com.) Readers are positioned to build intuition by participating in discovery.

This truly progressive introduction to sound engages and informs amateur and professional musicians, performers, teachers, sound engineers, students of many stripes, and indeed anyone interested in the auditory world. The book does not hesitate to follow entertaining and sometimes controversial side trips into the history and world of acoustics, reinforcing key concepts. You will discover how musical instruments really work, how pitch is perceived, and how sound can be amplified with no external power source.

Sound is key to our lives, and is the most accessible portal to the vibratory universe. This book takes you there.
- The first book on sound to offer interactive tools, building conceptual understanding via an experiential approach
- Supplementary website (http://www.
  whyyouhearwhatyouhear.com) will provide
- Java, MAX, and other free, multiplatform, interactive graphical and sound applets
- Extensive selection of original exercises available on the web with solutions
- Nearly 400 full-color illustrations, many of simulations that students can do
- Illustration Package::
  http://press.princeton.edu/textbooks/illustrations/heller/
- Professors: A solutions manual is available. Please email your request along with your name, institution, course, semester, and enrollment to: Ingrid_Gnerlich@press.princeton.edu

Hardcover $99.50/£69.95   ISBN: 9780691148595
624 pages. (2012)
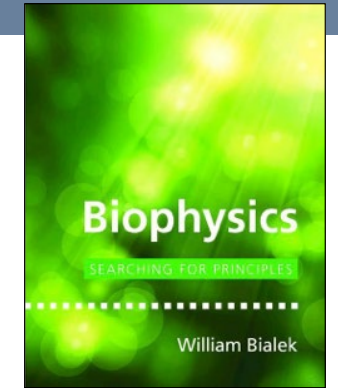
Interactions between the fields of physics and biology reach back over a century, and some of the most significant developments in biology—from the discovery of DNA's structure to imaging of the human brain—have involved collaboration across this disciplinary boundary. For a new generation of physicists, the phenomena of life pose exciting challenges to physics itself, and biophysics has emerged as an important subfield of this discipline. Here, William Bialek provides the first graduate-level introduction to biophysics aimed at physics students.

Bialek begins by exploring how photon counting in vision offers important lessons about the opportunities for quantitative, physics-style experiments on diverse biological phenomena. He draws from these lessons three general physical principles—the importance of noise, the need to understand the extraordinary performance of living systems without appealing to finely tuned parameters, and the critical role of the representation and flow of information in the business of life. Bialek then applies these principles to a broad range of phenomena, including the control of gene expression, perception and memory, protein folding, the mechanics of the inner ear, the dynamics of biochemical reactions, and pattern formation in developing embryos.

Featuring numerous problems and exercises throughout, *Biophysics* emphasizes the unifying power of abstract physical principles to motivate new and novel experiments on biological systems.

- Covers a range of biological phenomena from the physicist's perspective
- Features 200 problems
- Draws on statistical mechanics, quantum mechanics, and related mathematical concepts
- Includes an annotated bibliography and detailed appendixes
- Instructor's manual forthcoming
- Solutions for partial chapters at:
  http://www.princeton.edu/~wbialek/biophysbook.html

Hardcover $95.00/£65.00   ISBN: 9780691138916
640 pages. (2012)
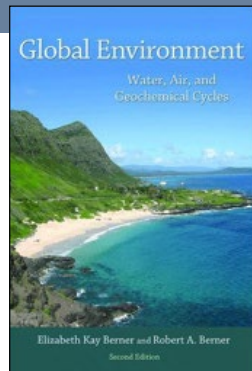
Global Environment
Water, Air, and Geochemical Cycles
(Second Edition)
Elizabeth Kay Berner,
Robert A. Berner

http://press.princeton.edu/titles/9772.html

Climate Dynamics
Kerry H. Cook

http://press.princeton.edu/titles/10041.html

This newly revised edition of *Global Environment* discusses the major elements of the geochemical cycles and global fluxes found in the atmosphere, land, lakes, rivers, biota, and oceans, as well as the human effects on these fluxes. Retaining the strengths of the original edition while incorporating the latest discoveries, this textbook takes an integrated, multidisciplinary, and global approach to geochemistry and environmental problems and introduces fundamental concepts of meteorology, surficial geology (weathering, erosion, and sedimentation), biogeochemistry, limnology, and oceanography.

New concepts and information in this updated edition include changes of atmospheric carbon dioxide over geologic time, major advances in the study of chemical weathering of rocks, ocean acidification, and important environmental problems, such as the amelioration of the acid rain problem due to reduction in sulfur deposition, problems with nitrification of soils and lakes, and eutrophication of rivers and estuaries.

- Revised edition takes a close look at global fluxes involving the atmosphere, land, lakes, rivers, biota, and oceans, and the human effects on these fluxes
- Detailed discussion of basic concepts including meteorology, surficial geology (weathering, erosion, and sedimentation), biogeochemistry, limnology, and oceanography
- An expanded up-to-date chapter on atmospheric chemistry and changing climate, including CO2, other greenhouse gases, and ozone
- Presentation of major advances in the study of chemical weathering
- Discussion of current environmental topics
- Global coverage of environmental problems involving water

Hardcover $85.00/£59.00   ISBN: 9780691136783
464 pages. (2012)
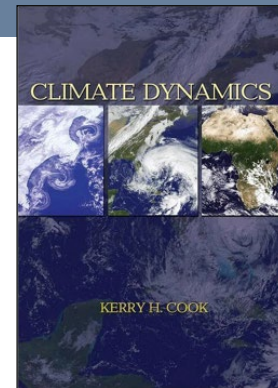
Climate Dynamics is an advanced undergraduate-level textbook that provides an essential foundation in the physical understanding of the earth's climate system. The book assumes no background in atmospheric or ocean sciences and is appropriate for any science or engineering student who has completed two semesters of calculus and one semester of calculus-based physics.

Describing the climate system based on observations of the mean climate state and its variability, the first section of the book introduces the vocabulary of the field, the dependent variables that characterize the climate system, and the typical approaches taken to display these variables. The second section of the book gives a quantitative understanding of the processes that determine the climate state—radiation, heat balances, and the basics of fluid dynamics. Applications for the atmosphere, ocean, and hydrological cycle are developed in the next section, and the last three chapters of the book directly address global climate change. Throughout, the textbook makes connections between mathematics and physics in order to illustrate the usefulness of mathematics, particularly first-year calculus, for predicting changes in the physical world.

Climate change will impact every aspect of life in the coming decades. This book supports and broadens understanding of the dynamics of the climate system by offering a much-needed introduction that is accessible to any science, math, or engineering student.

- Makes a physically based, quantitative understanding of climate change accessible to all science, engineering, and mathematics undergraduates
- Explains how the climate system works and why the climate is changing
- Reinforces, applies, and connects the basic ideas of calculus and physics
- Emphasizes fundamental observations and understanding
- Illustration package and solutions manual at:
  http://press.princeton.edu/titles/10041.html

Hardcover $65.00/£44.95   ISBN: 9780691125305
216 pages. (2013)
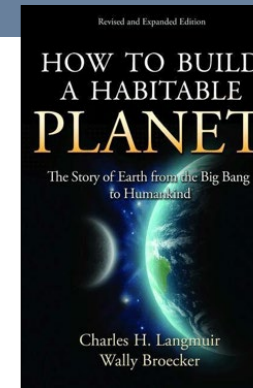
How to Build a Habitable Planet
The Story of Earth from the Big Bang to Humankind
(Revised and Expanded Edition)
Charles H. Langmuir,
Wally Broecker

http://press.princeton.edu/titles/9691.html

Mathematical Modeling of Earth's Dynamical Systems
A Primer
Rudy Slingerland, Lee Kump

http://press.princeton.edu/titles/9502.html

Since its first publication more than twenty-five years ago, *How to Build a Habitable Planet* has established a legendary reputation as an accessible yet scientifically impeccable introduction to the origin and evolution of Earth, from the Big Bang through the rise of human civilization. This classic account of how our habitable planet was assembled from the stuff of stars introduced readers to planetary, Earth, and climate science by way of a fascinating narrative. Now this great book has been made even better. Harvard geochemist Charles Langmuir has worked closely with the original author, Wally Broecker, one of the world's leading Earth scientists, to revise and expand the book for a new generation of readers for whom active planetary stewardship is becoming imperative.

Interweaving physics, astronomy, chemistry, geology, and biology, this sweeping account tells Earth's complete story, from the synthesis of chemical elements in stars, to the formation of the Solar System, to the evolution of a habitable climate on Earth, to the origin of life and humankind. The book also addresses the search for other habitable worlds in the Milky Way and contemplates whether Earth will remain habitable as our influence on global climate grows. It concludes by considering the ways in which humankind can sustain Earth's habitability and perhaps even participate in further planetary evolution.

Like no other book, *How to Build a Habitable Planet* provides an understanding of Earth in its broadest context, as well as a greater appreciation of its possibly rare ability to sustain life over geologic time.
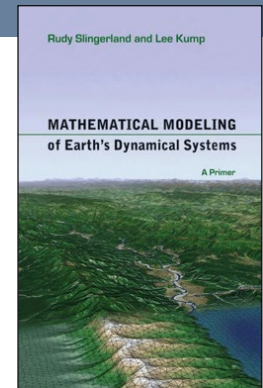
- Supporting materials for teaching and self learning that include a course syllabus, lecture slides, and book figures, see:
  http://www.habitableplanet.org.

Hardcover $39.95/£27.95   ISBN: 9780691140063
752 pages. (2012)

*Mathematical Modeling of Earth's Dynamical Systems* gives earth scientists the essential skills for translating chemical and physical systems into mathematical and computational models that provide enhanced insight into Earth's processes. Using a step-by-step method, the book identifies the important geological variables of physical- chemical geoscience problems and describes the mechanisms that control these variables.

This book is directed toward upper-level undergraduate students, graduate students, researchers, and professionals who want to learn how to abstract complex systems into sets of dynamic equations. It shows students how to recognize domains of interest and key factors, and how to explain assumptions in formal terms. The book reveals what data best tests ideas of how nature works, and cautions against inadequate transport laws, unconstrained coefficients, and unfalsifiable models. Various examples of processes and systems, and ample illustrations, are provided. Students using this text should be familiar with the principles of physics, chemistry, and geology, and have taken a year of differential and integral calculus.

Mathematical Modeling of Earth's Dynamical Systems helps earth scientists develop a philosophical framework and strong foundations for conceptualizing complex geologic systems.

- Step-by-step lessons for representing complex Earth systems as dynamical models
- Explains geologic processes in terms of fundamental laws of physics and chemistry
- Numerical solutions to differential equations through the finite difference technique
- A philosophical approach to quantitative problem-solving
- Various examples of processes and systems, including the evolution of sandy coastlines, the global carbon cycle, and much more
- Syllabus for Mathematical Modeling in the Geosciences
  http://press.princeton.edu/releases/m9502_syllabus.pdf
- Professors: A supplementary Instructor's Manual is available for this book. It is restricted to teachers using the text in courses. For information on how to obtain a copy, refer to:
  http://press.princeton.edu/class_use/solutions.html

Paperback $57.50/£39.95   ISBN: 9780691145143
248 pages. (2011)
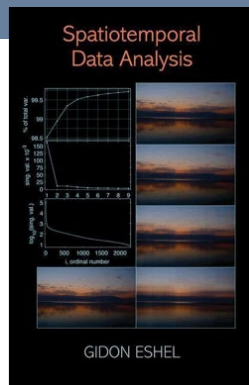
Spatiotemporal Data Analysis
Gidon Eshel

http://press.princeton.edu/titles/9637.html

A severe thunderstorm morphs into a tornado that cuts a swath of destruction through Oklahoma. How do we study the storm's mutation into a deadly twister? Avian flu cases are reported in China. How do we characterize the spread of the flu, potentially preventing an epidemic? The way to answer important questions like these is to analyze the spatial and temporal characteristics—origin, rates, and frequencies—of these phenomena. This comprehensive text introduces advanced undergraduate students, graduate students, and researchers to the statistical and algebraic methods used to analyze spatiotemporal data in a range of fields, including climate science, geophysics, ecology, astrophysics, and medicine.

Gidon Eshel begins with a concise yet detailed primer on linear algebra, providing readers with the mathematical foundations needed for data analysis. He then fully explains the theory and methods for analyzing spatiotemporal data, guiding readers from the basics to the most advanced applications. This self-contained, practical guide to the analysis of multidimensional data sets features a wealth of real-world examples as well as sample homework exercises and suggested exams.

Hardcover $85.00/£59.00   ISBN: 9780691128917
336 pages. (2011)

Statistical and Thermal Physics
With Computer Applications
Harvey Gould,
Jan Tobochnik

http://press.princeton.edu/titles/9375.html

This textbook carefully develops the main ideas and techniques of statistical and thermal physics and is intended for upper-level undergraduate courses. The authors each have more than thirty years' experience in teaching, curriculum development, and research in statistical and computational physics.

Statistical and Thermal Physics begins with a qualitative discussion of the relation between the macroscopic and microscopic worlds and incorporates computer simulations throughout the book to provide concrete examples of important conceptual ideas. Unlike many contemporary texts on thermal physics, this book presents thermodynamic reasoning as an independent way of thinking about macroscopic systems. Probability concepts and techniques are introduced, including topics that are useful for understanding how probability and statistics are used. Magnetism and the Ising model are considered in greater depth than in most undergraduate texts, and ideal quantum gases are treated within a uniform framework. Advanced chapters on fluids and critical phenomena are appropriate for motivated undergraduates and beginning graduate students.

- Integrates Monte Carlo and molecular dynamics simulations as well as other numerical techniques throughout the text
- Provides self-contained introductions to thermodynamics and statistical mechanics
- Discusses probability concepts and methods in detail
- Contains ideas and methods from contemporary research
- Includes advanced chapters that provide a natural bridge to graduate study
- Features more than 400 problems
- Programs are open source and available in an executable cross-platform format
- For supplementary materials, visit the authors' site: see link at http://press.princeton.edu/titles/9375.html
- Professors: A supplementary Solutions Manual is available for this book. It is restricted to teachers using the text in courses. For information on how to obtain a copy, refer to: http://press.princeton.edu/class_use/solutions.html

Hardcover $95.00/£65.00   ISBN: 9780691137445
536 pages. (2010)
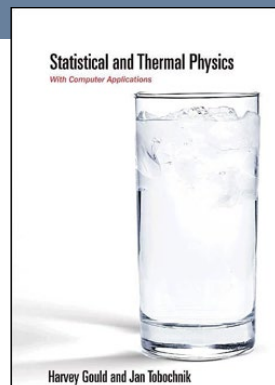
Modern Classical Physics
Optics, Fluids, Plasmas, Elasticity, Relativity, and Statistical Physics
Kip S. Thorne, Roger D. Blandford

http://press.princeton.edu/titles/10157.html

This first-year, graduate-level text and reference book covers the fundamental concepts and twenty-first-century applications of six major areas of classical physics that every masters- or PhD-level physicist should be exposed to, but often isn't: statistical physics, optics (waves of all sorts), elastodynamics, fluid mechanics, plasma physics, and special and general relativity and cosmology. Growing out of a full-year course that the eminent researchers Kip Thorne and Roger Blandford taught at Caltech for almost three decades, this book is designed to broaden the training of physicists. Its six main topical sections are also designed so they can be used in separate courses, and the book provides an invaluable reference for researchers.

- Presents all the major fields of classical physics except three prerequisites: classical mechanics, electromagnetism, and elementary thermodynamics
- Elucidates the interconnections between diverse fields, and explains their shared concepts and tools
- Focuses on fundamental concepts and modern, real-world applications
- Takes applications from fundamental, experimental, and applied physics; astrophysics and cosmology; geophysics, oceanography, and meteorology; biophysics and chemical physics; engineering and optical science and technology; and information science and technology
- Emphasizes the quantum roots of classical physics, and how to use quantum techniques to elucidate classical concepts or simplify classical calculations
- Features hundreds of color figures, some five hundred exercises, extensive cross- references, and a detailed index
- An online illustration package is forthcoming, visit: http://press.princeton.edu/titles/10157.html

Hardcover $99.50/£69.95   ISBN: 9780691159027
1024 pages. (Forthcoming 2014)

Engineering Dynamics
A Comprehensive Introduction
N. Jeremy Kasdin,
Derek A. Paley

http://press.princeton.edu/titles/9498.html

This textbook introduces undergraduate students to engineering dynamics using an innovative approach that is at once accessible and comprehensive. Combining the strengths of both beginner and advanced dynamics texts, this book has students solving dynamics problems from the very start and gradually guides them from the basics to increasingly more challenging topics without ever sacrificing rigor.

Engineering Dynamics spans the full range of mechanics problems, from one-dimensional particle kinematics to three-dimensional rigid-body dynamics, including an introduction to Lagrange's and Kane's methods. It skillfully blends an easy-to-read, conversational style with careful attention to the physics and mathematics of engineering dynamics, and emphasizes the formal systematic notation students need to solve problems correctly and succeed in more advanced courses. This richly illustrated textbook features numerous real-world examples and problems, incorporating a wide range of difficulty; ample use of MATLAB for solving problems; helpful tutorials; suggestions for further reading; and detailed appendixes.

- Provides an accessible yet rigorous introduction to engineering dynamics
- Uses an explicit vector-based notation to facilitate understanding
- Note on the Notation, Syllabus and Errata at: http://press.princeton.edu/titles/9498.html
- Professors: A supplementary Instructor's Manual is available for this book. It is restricted to teachers using the text in courses. For information on how to obtain a copy, refer to: http://press.princeton.edu/class_use/solutions.html

Hardcover $105.00/£72.00   ISBN: 9780691135373
688 pages. (2011)
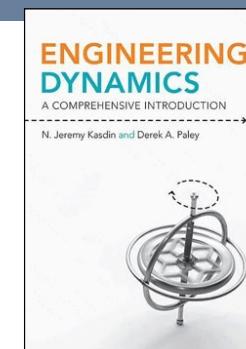
Galactic Astronomy
James Binney, Michael Merrifield

http://press.princeton.edu/titles/6358.html

This is the definitive treatment of the phenomenology of galaxies—a clear and comprehensive volume that takes full account of the extraordinary recent advances in the field. The book supersedes the classic text *Galactic Astronomy* that James Binney wrote with Dimitri Mihalas, and complements *Galactic Dynamics* by Binney and Scott Tremaine. It will be invaluable to researchers and is accessible to any student who has a background in undergraduate physics.

The book draws on observations both of our own galaxy, the Milky Way, and of external galaxies. The two sources are complementary, since the former tends to be highly detailed but difficult to interpret, while the latter is typically poorer in quality but conceptually simpler to understand. Binney and Merrifield introduce all astronomical concepts necessary to understand the properties of galaxies, including coordinate systems, magnitudes and colors, the phenomenology of stars, the theory of stellar and chemical evolution, and the measurement of astronomical distances. The book's core covers the phenomenology of external galaxies, star clusters in the Milky Way, the interstellar media of external galaxies, gas in the Milky Way, the structure and kinematics of the stellar components of the Milky Way, and the kinematics of external galaxies.

Throughout, the book emphasizes the observational basis for current understanding of galactic astronomy, with references to the original literature. Offering both new information and a comprehensive view of its subject, it will be an indispensable source for professionals, as well as for graduate students and advanced undergraduates.

Paperback $90.00/£62.00   ISBN: 9780691025650
850 pages. (1998)

Galactic Dynamics
(Second Edition)
James Binney,
Scott Tremaine

http://press.princeton.edu/titles/8697.html
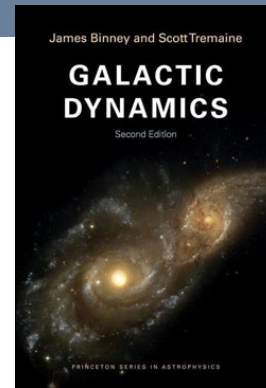
Since it was first published in 1987, *Galactic Dynamics* has become the most widely used advanced textbook on the structure and dynamics of galaxies and one of the most cited references in astrophysics. Now, in this extensively revised and updated edition, James Binney and Scott Tremaine describe the dramatic recent advances in this subject, making *Galactic Dynamics* the most authoritative introduction to galactic astrophysics available to advanced undergraduate students, graduate students, and researchers.

Every part of the book has been thoroughly overhauled, and many sections have been completely rewritten. Many new topics are covered, including N-body simulation methods, black holes in stellar systems, linear stability and response theory, and galaxy formation in the cosmological context. Binney and Tremaine, two of the world's leading astrophysicists, use the tools of theoretical physics to describe how galaxies and other stellar systems work, succinctly and lucidly explaining theoretical principles and their applications to observational phenomena. They provide readers with an understanding of stellar dynamics at the level needed to reach the frontiers of the subject.

This new edition of the classic text is the definitive introduction to the field.

- A complete revision and update of one of the most cited references in astrophysics
- Provides a comprehensive description of the dynamical structure and evolution of galaxies and other stellar systems
- Serves as both a graduate textbook and a resource for researchers
- Includes 20 color illustrations, 205 figures, and more than 200 problems
- Covers the gravitational N-body problem, hierarchical galaxy formation, galaxy mergers, dark matter, spiral structure, numerical simulations, orbits and chaos, equilibrium and stability of stellar systems, evolution of binary stars and star clusters, and much more
- Companion volume to *Galactic Astronomy*, the definitive book on the phenomenology of galaxies and star clusters

Paperback $90.00/£62.00   ISBN: 9780691130279
904 pages. (2008)
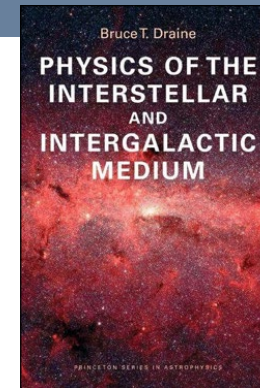
Physics of the Interstellar and Intergalactic Medium
Bruce T. Draine

http://press.princeton.edu/titles/9499.html

This is a comprehensive and richly illustrated textbook on the astrophysics of the interstellar and intergalactic medium—the gas and dust, as well as the electromagnetic radiation, cosmic rays, and magnetic and gravitational fields, present between the stars in a galaxy and also between galaxies themselves.

Topics include radiative processes across the electromagnetic spectrum; radiative transfer; ionization; heating and cooling; astrochemistry; interstellar dust; fluid dynamics, including ionization fronts and shock waves; cosmic rays; distribution and evolution of the interstellar medium; and star formation. While it is assumed that the reader has a background in undergraduate-level physics, including some prior exposure to atomic and molecular physics, statistical mechanics, and electromagnetism, the first six chapters of the book include a review of the basic physics that is used in later chapters. This graduate-level textbook includes references for further reading, and serves as an invaluable resource for working astrophysicists.

- Essential textbook on the physics of the interstellar and intergalactic medium
- Based on a course taught by the author for more than twenty years at Princeton University
- Covers radiative processes, fluid dynamics, cosmic rays, astrochemistry, interstellar dust, and more
- Discusses the physical state and distribution of the ionized, atomic, and molecular phases of the interstellar medium
- Reviews diagnostics using emission and absorption lines
- Features color illustrations and detailed reference materials in appendices
- Professors: A supplementary Solutions Manual is available for this book. It is restricted to teachers using the text in courses. For information on how to obtain a copy, refer to: http://press.princeton.edu/class_use/solutions.html

Paperback $72.50/£50.00   ISBN: 9780691122144
568 pages. (2010)

High Energy Radiation from Black Holes
Gamma Rays, Cosmic Rays, and Neutrinos
Charles D. Dermer,
Govind Menon

http://press.princeton.edu/titles/9092.html
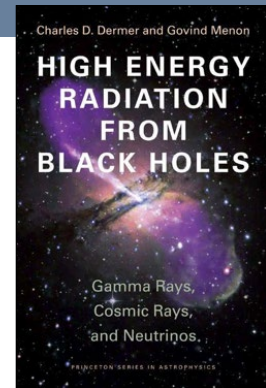
Bright gamma-ray flares observed from sources far beyond our Milky Way Galaxy are best explained if enormous amounts of energy are liberated by black holes. The highest- energy particles in nature—the ultra-high-energy cosmic rays—cannot be confined by the Milky Way's magnetic field, and must originate from sources outside our Galaxy. Understanding these energetic radiations requires an extensive theoretical framework involving the radiation physics and strong-field gravity of black holes. In *High Energy Radiation from Black Holes*, Charles Dermer and Govind Menon present a systematic exposition of black-hole astrophysics and general relativity in order to understand how gamma rays, cosmic rays, and neutrinos are produced by black holes.

Beginning with Einstein's special and general theories of relativity, the authors give a detailed mathematical description of fundamental astrophysical radiation processes, including Compton scattering of electrons and photons, synchrotron radiation of particles in magnetic fields, photohadronic interactions of cosmic rays with photons, gamma-ray attenuation, Fermi acceleration, and the Blandford-Znajek mechanism for energy extraction from rotating black holes. The book provides a basis for graduate students and researchers in the field to interpret the latest results from high-energy observatories, and helps resolve whether energy released by rotating black holes powers the highest-energy radiations in nature. The wide range of detail will make *High Energy Radiation from Black Holes* a standard reference for black-hole research.

Paperback $87.50/£61.00   ISBN: 9780691144085
560 pages. (2009)
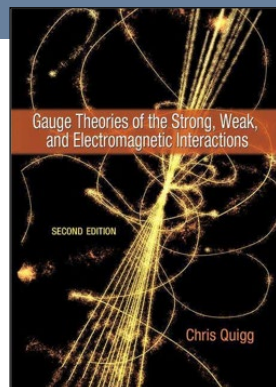
Gauge Theories of the Strong, Weak, and Electromagnetic Interactions
(Second Edition)
Chris Quigg

http://press.princeton.edu/titles/10156.html

This completely revised and updated graduate-level textbook is an ideal introduction to gauge theories and their applications to high-energy particle physics, and takes an in-depth look at two new laws of nature—quantum chromodynamics and the electroweak theory. From quantum electrodynamics through unified theories of the interactions among leptons and quarks, Chris Quigg examines the logic and structure behind gauge theories and the experimental underpinnings of today's theories. Quigg emphasizes how we know what we know, and in the era of the Large Hadron Collider, his insightful survey of the standard model and the next great questions for particle physics makes for compelling reading.

The brand-new edition shows how the electroweak theory developed in conversation with experiment. Featuring a wide-ranging treatment of electroweak symmetry breaking, the physics of the Higgs boson, and the importance of the 1-TeV scale, the book moves beyond established knowledge and investigates the path toward unified theories of strong, weak, and electromagnetic interactions. Explicit calculations and diverse exercises allow readers to derive the consequences of these theories. Extensive annotated bibliographies accompany each chapter, amplify points of conceptual or technical interest, introduce further applications, and lead readers to the research literature. Students and seasoned practitioners will profit from the text's current insights, and specialists wishing to understand gauge theories will find the book an ideal reference for self-study.

• Brand-new edition of a landmark text introducing gauge theories
• Consistent attention to how we know what we know
• Explicit calculations develop concepts and engage with experiment
• Interesting and diverse problems sharpen skills and ideas
• Extensive annotated bibliographies

Hardcover $75.00/£52.00   ISBN: 9780691135489
496 pages. (2013)

Physics and Technology for Future Presidents
An Introduction to the Essential Physics Every World Leader Needs to Know
Richard A. Muller
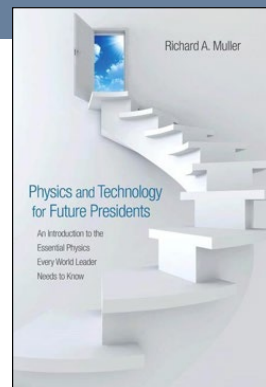
http://press.princeton.edu/titles/9226.html

Physics and Technology for Future Presidents contains the essential physics that students need in order to understand today's core science and technology issues, and to become the next generation of world leaders. From the physics of energy to climate change, and from spy technology to quantum computers, this is the only textbook to focus on the modern physics affecting the decisions of political leaders and CEOs and, consequently, the lives of every citizen. How practical are alternative energy sources?

Can satellites really read license plates from space? What is the quantum physics behind iPods and supermarket scanners? And how much should we fear a terrorist nuke? This lively book empowers students possessing any level of scientific background with the tools they need to make informed decisions and to argue their views persuasively with anyone—expert or otherwise.

Based on Richard Muller's renowned course at Berkeley, the book explores critical physics topics: energy and power, atoms and heat, gravity and space, nuclei and radioactivity, chain reactions and atomic bombs, electricity and magnetism, waves, light, invisible light, climate change, quantum physics, and relativity. Muller engages readers through many intriguing examples, helpful tips to remember, a fun-to-read text, and an emphasis on real-world problems rather than mathematical computation. He includes chapter summaries, essay and discussion questions, Internet research topics, and handy tips for instructors to make the classroom experience more rewarding.

Accessible and entertaining, *Physics and Technology for Future Presidents* gives students the scientific fluency they need to become well-rounded leaders in a world driven by science and technology.

• Professors: A supplementary Instructor's Manual is available for this book. It is restricted to teachers using the text in courses. For information on how to obtain a copy, refer to: http://press.princeton.edu/class_use/solutions.html

Hardcover $69.50/£48.95   ISBN: 9780691135045
536 pages. (2010)
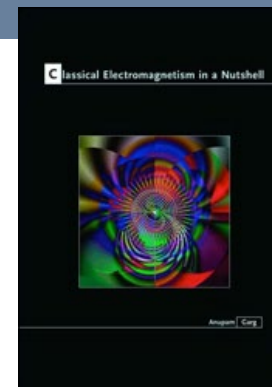
Classical Electromagnetism in a Nutshell
Anupam Garg

http://press.princeton.edu/titles/9771.html

This graduate-level physics textbook provides a comprehensive treatment of the basic principles and phenomena of classical electromagnetism. While many electromagnetism texts use the subject to teach mathematical methods of physics, here the emphasis is on the physical ideas themselves. Anupam Garg distinguishes between electromagnetism in vacuum and that in material media, stressing that the core physical questions are different for each. In vacuum, the focus is on the fundamental content of electromagnetic laws, symmetries, conservation laws, and the implications for phenomena such as radiation and light. In material media, the focus is on understanding the response of the media to imposed fields, the attendant constitutive relations, and the phenomena encountered in different types of media such as dielectrics, ferromagnets, and conductors. The text includes applications to many topical subjects, such as magnetic levitation, plasmas, laser beams, and synchrotrons.

Classical Electromagnetism in a Nutshell is ideal for a yearlong graduate course and features more than 300 problems, with solutions to many of the advanced ones. Key formulas are given in both SI and Gaussian units; the book includes a discussion of how to convert between them, making it accessible to adherents of both systems.

• Offers a complete treatment of classical electromagnetism
• Emphasizes physical ideas
• Separates the treatment of electromagnetism in vacuum and material media
• Presents key formulas in both SI and Gaussian units
• Covers applications to other areas of physics
• Includes more than 300 problems

Hardcover $99.50/£69.95   ISBN: 9780691130187
712 pages. (2012)

String Theory in a Nutshell
Elias Kiritsis

http://press.princeton.edu/titles/8456.html
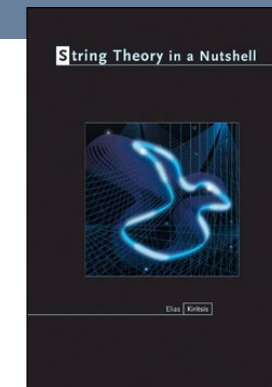
This book is the essential new introduction to modern string theory, by one of the world's authorities on the subject. Concise, clearly presented, and up-to-date, *String Theory in a Nutshell* brings together the best understood and most important aspects of a theory that has been evolving since the early 1980s. A core model of physics that substitutes one-dimensional extended "strings" for zero-dimensional point-like particles (as in quantum field theory), string theory has been the leading candidate for a theory that would successfully unify all fundamental forces of nature, including gravity.

Starting with the basic definitions of the theory, Elias Kiritsis guides readers through classic and modern topics. In particular, he treats perturbative string theory and its Conformal Field Theory (CFT) tools in detail while also developing nonperturbative aspects and exploring the unity of string interactions. He presents recent topics including black holes, their microscopic entropy, and the AdS/CFT correspondence. He also describes matrix model tools for string theory. In all, the book contains nearly five hundred exercises for the graduate-level student, and works as a self-contained and detailed guide to the literature.

String Theory in a Nutshell is the staple one-volume reference on the subject not only for students and researchers of theoretical high-energy physics, but also for mathematicians and physicists specializing in theoretical cosmology and QCD.

Hardcover $90.00/£62.00   ISBN: 9780691122304
608 pages. (2007)
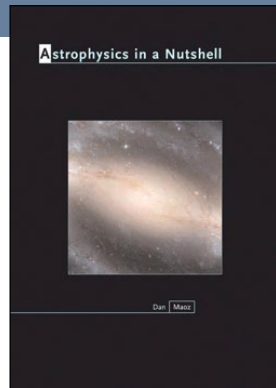
Astrophysics in a Nutshell
Dan Maoz

http://press.princeton.edu/titles/8457.html

A concise but thorough introduction to the observational data and theoretical concepts underlying modern astronomy, *Astrophysics in a Nutshell* is designed for advanced undergraduate science majors taking a one-semester course. This well-balanced and up-to-date textbook covers the essentials of modern astrophysics—from stars to cosmology—emphasizing the common, familiar physical principles that govern astronomical phenomena, and the interplay between theory and observation.

In addition to traditional topics such as stellar remnants, galaxies, and the interstellar medium, Astrophysics in a Nutshell introduces subjects at the forefront of modern research, including black holes, dark matter, gravitational lensing, and dark energy, all updated with some of the latest observational results. To aid physical understanding, mathematical derivations are kept as simple, short, and clear as possible, and order-of- magnitude estimates, dimensional analysis, and scaling arguments are frequently used. These no-nonsense, "back-of-the-envelope" calculations train students to think like physicists. The book is amply illustrated with simple, clear figures and each chapter ends with a set of problems.

In addition to serving as a course textbook, *Astrophysics in a Nutshell* is an ideal review for a qualifying exam and a handy reference for teachers and researchers.

- The most concise and up-to-date astrophysics textbook for science majors
- Contains a broad and well-balanced choice of traditional subjects and current research topics
- Uses simple, short, and clear derivations of physical results
- Trains students in the essential skills of order-of-magnitude analysis
- Includes teaching problems with each chapter
- Professors: A supplementary Solutions Manual is available for this book. It is restricted to teachers using the text in courses. For information on how to obtain a copy, refer to: http://press.princeton.edu/class_use/solutions.html

Hardcover $80.00/£55.00   ISBN: 9780691125848
272 pages. (2007)

Condensed Matter in a Nutshell
Gerald D. Mahan

http://press.princeton.edu/titles/9374.html

Condensed Matter in a Nutshell is the most concise, accessible, and self-contained introduction to this exciting and cutting-edge area of modern physics. This premier textbook covers all the standard topics, including crystal structures, energy bands, phonons, optical properties, ferroelectricity, superconductivity, and magnetism. It includes in-depth discussions of transport theory, nanoscience, and semiconductors, and also features the latest experimental advances in this fast-developing field, such as high-temperature superconductivity, the quantum Hall effect, graphene, nanotubes, localization, Hubbard models, density functional theory, phonon focusing, and Kapitza resistance. Rich in detail and full of examples and problems, this textbook is the complete resource for a two-semester graduate course in condensed matter and material physics.

- Covers standard topics like crystal structures, energy bands, and phonons
- Features the latest advances like high-temperature superconductivity and more
- Full of instructive examples and challenging problems
- Professors: A supplementary Solutions Manual is available for this book. It is restricted to teachers using the text in courses. For information on how to obtain a copy, refer to: http://press.princeton.edu/class_use/solutions.html

Hardcover $90.00/£62.00   ISBN: 9780691140162
592 pages. (2010)
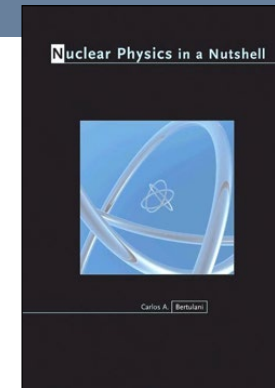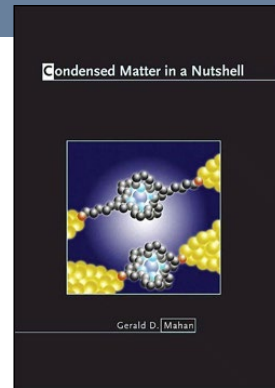
Nuclear Physics in a Nutshell
Carlos A. Bertulani

http://press.princeton.edu/titles/8455.html

Nuclear Physics in a Nutshell provides a clear, concise, and up-to-date overview of the atomic nucleus and the theories that seek to explain it. Bringing together a systematic explanation of hadrons, nuclei, and stars for the first time in one volume, Carlos A. Bertulani provides the core material needed by graduate and advanced undergraduate students of physics to acquire a solid understanding of nuclear and particle science. *Nuclear Physics in a Nutshell* is the definitive new resource for anyone considering a career in this dynamic field.

The book opens by setting nuclear physics in the context of elementary particle physics and then shows how simple models can provide an understanding of the properties of nuclei, both in their ground states and excited states, and also of the nature of nuclear reactions. It then describes: nuclear constituents and their characteristics; nuclear interactions; nuclear structure, including the liquid-drop model approach, and the nuclear shell model; and recent developments such as the nuclear mean-field and the nuclear physics of very light nuclei, nuclear reactions with unstable nuclear beams, and the role of nuclear physics in energy production and nucleosynthesis in stars.

Throughout, discussions of theory are reinforced with examples that provide applications, thus aiding students in their reading and analysis of current literature.

Each chapter closes with problems, and appendixes address supporting technical topics.

Hardcover $95.00/£65.00   ISBN: 9780691125053
488 pages. (2007)

Quantum Mechanics in a Nutshell
Gerald D. Mahan

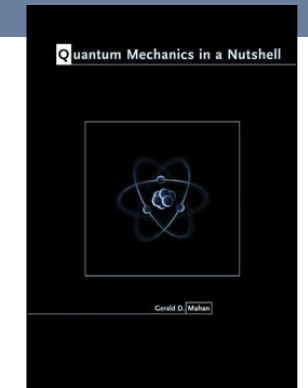http://press.princeton.edu/titles/8965.html

Covering the fundamentals as well as many special topics of current interest, this is the most concise, up-to-date, and accessible graduate-level textbook on quantum mechanics available. Written by Gerald Mahan, a distinguished research physicist and author of an acclaimed textbook on many-particle physics, *Quantum Mechanics in a Nutshell* is the distillation of many years' teaching experience.
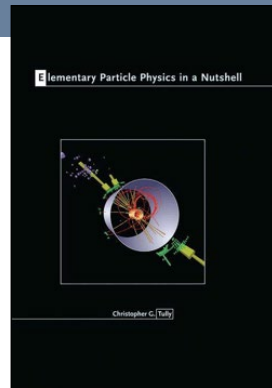
Emphasizing the use of quantum mechanics to describe actual quantum systems such as atoms and solids, and rich with interesting applications, the book proceeds from solving for the properties of a single particle in potential; to solving for two particles (the helium atom); to addressing many-particle systems. Applications include electron gas, magnetism, and Bose-Einstein Condensation; examples are carefully chosen and worked; and each chapter has numerous homework problems, many of them original.

Quantum Mechanics in a Nutshell expertly addresses traditional and modern topics, including perturbation theory, WKBJ, variational methods, angular momentum, the Dirac equation, many-particle wave functions, Casimir Force, and Bell's Theorem. And it treats many topics—such as the interactions between photons and electrons, scattering theory, and density functional theory—in exceptional depth.

- The most concise, up-to-date, and accessible graduate textbook on the subject
- Contains the ideal amount of material for a two-semester course
- Focuses on the description of actual quantum systems, including a range of applications
- Covers traditional topics, as well as those at the frontiers of research
- Treats in unprecedented detail topics such as photon-electron interaction, scattering theory, and density functional theory
- Includes numerous homework problems at the end of each chapter
- Professors: A supplementary Solutions Manual is available for this book. It is restricted to teachers using the text in courses. For information on how to obtain a copy, refer to: http://press.princeton.edu/class_use/solutions.html

Hardcover $90.00/£62.00   ISBN: 9780691137131
416 pages. (2008)

Elementary Particle Physics in a Nutshell
Christopher G. Tully

http://press.princeton.edu/titles/9633.html

Statistical Mechanics in a Nutshell
Luca Peliti

http://press.princeton.edu/titles/9634.html

The new experiments underway at the Large Hadron Collider at CERN in Switzerland may significantly change our understanding of elementary particle physics and, indeed, the universe. This textbook provides a cutting-edge introduction to the field, preparing first-year graduate students and advanced undergraduates to understand and work in LHC physics at the dawn of what promises to be an era of experimental and theoretical breakthroughs.

Christopher Tully, an active participant in the work at the LHC, explains some of the most recent experiments in the field. But this book, which emerged from a course at Princeton University, also provides a comprehensive understanding of the subject. It explains every elementary particle physics process—whether it concerns nonaccelerator experiments, particle astrophysics, or the description of the early universe—as a gauge interaction coupled to the known building blocks of matter. Designed for a one-semester course that is complementary to a course in quantum field theory, the book gives special attention to high-energy collider physics, and includes a detailed discussion of the state of the search for the Higgs boson.

- Introduces elementary particle processes relevant to astrophysics, collider physics, and the physics of the early universe
- Covers experimental methods, detectors, and measurements
- Features a detailed discussion of the Higgs boson search
- Includes many challenging exercises
- Link to Professor Tully's Course Syllabus at:
  http://press.princeton.edu/titles/9633.html
- Professors: A supplementary Instructor's Manual which provides solutions for Chapters 1-3 of the textbook, is available as a PDF. It is restricted to teachers using the text in courses. To obtain a copy, please email your request to:
  Ingrid_Gnerlich@press.princeton.edu

Hardcover $75.00/£52.00   ISBN: 9780691131160
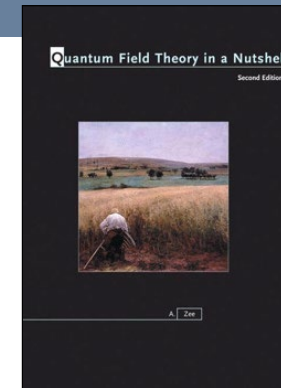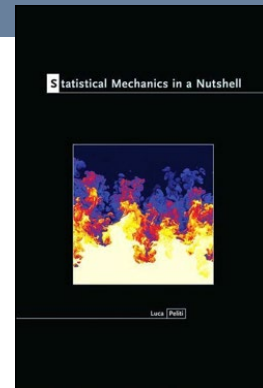320 pages. (2011)

Statistical mechanics is one of the most exciting areas of physics today, and it also has applications to subjects as diverse as economics, social behavior, algorithmic theory, and evolutionary biology. Statistical Mechanics in a Nutshell offers the most concise, self-contained introduction to this rapidly developing field. Requiring only a background in elementary calculus and elementary mechanics, this book starts with the basics, introduces the most important developments in classical statistical mechanics over the last thirty years, and guides readers to the very threshold of today's cutting-edge research.

Statistical Mechanics in a Nutshell zeroes in on the most relevant and promising advances in the field, including the theory of phase transitions, generalized Brownian motion and stochastic dynamics, the methods underlying Monte Carlo simulations, complex systems—and much, much more. The essential resource on the subject, this book is the most up-to-date and accessible introduction available for graduate students and advanced undergraduates seeking a succinct primer on the core ideas of statistical mechanics.

- Provides the most concise, self-contained introduction to statistical mechanics
- Focuses on the most promising advances, not complicated calculations
- Requires only elementary calculus and elementary mechanics
- Guides readers from the basics to the threshold of modern research
- Highlights the broad scope of applications of statistical mechanics

Hardcover $75.00/£52.00   ISBN: 9780691145297
416 pages. (2011)

Quantum Field Theory in a Nutshell
(Second Edition)
A. Zee

http://press.princeton.edu/titles/9227.html

Einstein Gravity in a Nutshell
A. Zee

http://press.princeton.edu/titles/10038.html

Since it was first published, Quantum Field Theory in a Nutshell has quickly established itself as the most accessible and comprehensive introduction to this profound and deeply fascinating area of theoretical physics. Now in this fully revised and expanded edition, A. Zee covers the latest advances while providing a solid conceptual foundation for students to build on, making this the most up-to-date and modern textbook on quantum field theory available.

This expanded edition features several additional chapters, as well as an entirely new section describing recent developments in quantum field theory such as gravitational waves, the helicity spinor formalism, on-shell gluon scattering, recursion relations for amplitudes with complex momenta, and the hidden connection between Yang-Mills theory and Einstein gravity. Zee also provides added exercises, explanations, and examples, as well as detailed appendices, solutions to selected exercises, and suggestions for further reading.

- The most accessible and comprehensive introductory textbook available
- Features a fully revised, updated, and expanded text
- Covers the latest exciting advances in the field
- Includes new exercises
- Offers a one-of-a-kind resource for students and researchers

Hardcover $85.00/£59.00   ISBN: 9780691140346
608 pages. (2010)

This unique textbook provides an accessible introduction to Einstein's general theory of relativity, a subject of breathtaking beauty and supreme importance in physics. With his trademark blend of wit and incisiveness, A. Zee guides readers from the fundamentals of Newtonian mechanics to the most exciting frontiers of research today, including de Sitter and anti-de Sitter spacetimes, Kaluza-Klein theory, and brane worlds. Unlike other books on Einstein gravity, this book emphasizes the action principle and group theory as guides in constructing physical theories. Zee treats various topics in a spiral style that is easy on beginners, and includes anecdotes from the history of physics that will appeal to students and experts alike. He takes a friendly approach to the required mathematics, yet does not shy away from more advanced mathematical topics such as differential forms. The extensive discussion of black holes includes rotating and extremal black holes and Hawking radiation. The ideal textbook for undergraduate and graduate students, Einstein Gravity in a Nutshell also provides an essential resource for professional physicists and is accessible to anyone familiar with classical mechanics and electromagnetism. It features numerous exercises as well as detailed appendices covering a multitude of topics not readily found elsewhere.

- Provides an accessible introduction to Einstein's general theory of relativity
- Guides readers from Newtonian mechanics to the frontiers of modern research
- Emphasizes symmetry and the Einstein-Hilbert action
- Covers topics not found in standard textbooks on Einstein gravity
- Includes interesting historical asides
- Features numerous exercises and detailed appendices
- Ideal for students, physicists, and scientifically minded lay readers
- Professors: A supplementary Instructor's Manual is available for this book. It is restricted to teachers using the text in courses. For information on how to obtain copy, refer to:
  http://press.princeton.edu/class_use/solutions.html

Hardcover $90.00/£62.00   ISBN: 9780691145587
888 pages. (2013)