Probability And Random Processes Second Edition With Applications To Signal Processing And Communications

The second edition enhanced with new chapters, figures, andappendices to cover the new developments in applied mathematicalfunctions This book examines the topics of applied mathematical functionsto problems that engineers and researchers solve daily in thecourse of their work. The text covers set theory, combinatorics,random variables, discrete and continuous probability, distributionfunctions, convergence of random variables, computer generation ofrandom variates, random processes and stationarity concepts withassociated autocovariance and cross covariance functions,estimation theory and Wiener and Kalman filtering ending with twoapplications of probabilistic methods. Probability tables with ninedecimal place accuracy and graphical Fourier transform tables areincluded for quick reference. The author facilitates understandingof probability concepts for both students and practitioners bypresenting over 450 carefully detailed figures and illustrations,and over 350 examples with every step explained clearly and somewith multiple solutions. Additional features of the second edition of Probability andRandom Processes are: Updated chapters with new sections on Newton-Pepys'problem; Pearson, Spearman, and Kendal correlation coefficients;adaptive estimation techniques; birth and death processes; andrenewal processes with generalizations A new chapter on Probability Modeling in TeletrafficEngineering written by Kavitha Chandra An eighth appendix examining the computation of the roots ofdiscrete probability-generating functions With new material on theory and applications of probability,Probability and Random Processes, Second Edition is athorough and comprehensive reference for commonly occurringproblems in probabilistic methods and their applications.

Study faster, learn better, and get top grades Modified to conform to the current curriculum, Schaum's Outline of Probability, Random Variables, and Random Processes complements these courses in scope and sequence to help you understand its basic concepts. The book offers extra practice on topics such as bivariate random variables, joint distribution functions, moment generating functions, Poisson processes, Wiener processes, power spectral densities, and white noise. You'll also get coverage of linear systems to random outputs, Fourier series and Karhunen-Loéve expansions, Fourier transform of random processes, parameter estimation, Bayes' estimation, and mean square estimation. Appropriate for the following courses: Probability, Random Processes, Stochastic Processes, Probability and Random Variables, Introduction to Probability and Statistics Features: 405 solved problems Additional material on distributions, the Markov Process, and Martingales Support for all the major textbooks for probability, variables, and processes courses Topics include: Probability, Random Variables, Multiple Random Variables, Functions of Random Variables, Expectation, Limit Theorems, Random Processes, Analysis and Processing of Random Processes, Estimation Theory, Decision Theory, Queueing Theory

"Written by two renowned experts in the field, the books under review contain a thorough and insightful treatment of the fundamental underpinnings of various aspects of stochastic processes as well as a wide range of applications. Providing clear exposition, deep mathematical results, and superb technical representation, they are masterpieces of the subject of stochastic analysis and nonlinear filtering....These books...will become classics." --SIAM REVIEW

This second edition has a unique approach that provides a broad and wide introduction into the fascinating area of probability theory. It starts on a fast track with the treatment of probability theory and stochastic processes by providing short proofs. The last chapter is unique as it features a wide range of applications in other fields like Vlasov dynamics of fluids, statistics of circular data, singular continuous random variables, Diophantine equations, percolation theory, random Schrödinger operators, spectral graph theory, integral geometry, computer vision, and processes with high risk.Many of these areas are under active investigation and this volume is highly suited for ambitious undergraduate students, graduate students and researchers.

Applied Probability and Stochastic Processes, Second Edition presents a self-contained introduction to elementary probability theory and stochastic processes with a special emphasis on their applications in science, engineering, finance, computer science, and operations research. It covers the theoretical foundations for modeling time-dependent random phenomena in these areas and illustrates applications through the analysis of numerous practical examples. The author draws on his 50 years of experience in the field to give your students a better understanding of probability theory and stochastic processes and enable them to use stochastic modeling in their work. New to the Second Edition Completely rewritten part on probability theory—now more than double in size New sections on time series analysis, random walks, branching processes, and spectral analysis of stationary stochastic processes Comprehensive numerical discussions of examples, which replace the more theoretically challenging sections Additional examples, exercises, and figures Presenting the material in a student-friendly, application-oriented manner, this non-measure theoretic text only assumes a mathematical maturity that applied science students acquire during their undergraduate studies in mathematics. Many exercises allow students to assess their understanding of the topics. In addition, the book occasionally describes connections between probabilistic concepts and corresponding statistical approaches to facilitate comprehension. Some important proofs and challenging examples and exercises are also included for more theoretically interested readers.

Emphasizing fundamental mathematical ideas rather than proofs, Introduction to Stochastic Processes, Second Edition provides quick access to important foundations of probability theory applicable to problems in many fields. Assuming that you have a reasonable level of computer literacy, the ability to write simple programs, and the access to software for linear algebra computations, the author approaches the problems and theorems with a focus on stochastic processes evolving with time, rather than a particular emphasis on measure theory. For those lacking in exposure to linear differential and difference equations, the author begins with a brief introduction to these concepts. He proceeds to discuss Markov chains, optimal stopping, martingales, and Brownian motion. The book concludes with a chapter on stochastic integration. The author supplies many basic, general examples and provides exercises at the end of each chapter. New to the Second Edition: Expanded chapter on stochastic integration that introduces modern mathematical finance Introduction of Girsanov transformation and the Feynman-Kac formula Expanded discussion of Itô's formula and the Black-Scholes formula for pricing options New topics such as Doob's maximal inequality and a discussion on self similarity in the chapter on Brownian motion Applicable to the fields of mathematics, statistics, and engineering as well as computer science, economics, business, biological science, psychology, and engineering, this concise introduction is an excellent resource both for students and professionals.

Algebraic methods in markov chains; Ratio theorems of transition probabilities and applications; Sums of independent random variables as a markov chain; Order statistics, poisson processes, and applications; Continuous time markov chains; Diffusion processes; Compouding stochastic processes; Fluctuation theory of partial sums of independent identically distributed random variables; Queueing processes.

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It was originally planned that the Theory of Stochastic Processes would consist of two volumes: the first to be devoted to general problems and the second to specific cJasses of random processes. It became apparent, however, that the amount of material related to specific problems of the theory could not possibly be incJuded in one volume. This is how the present third volume came into being. This voJume contains the theory of martingales, stochastic integrals, stochastic differential equations, diffusion, and continuous Markov processes. The theory of stochastic processes is an actively developing branch of mathe matics, and it would be an unreasonable and impossible task to attempt to encompass it in a single treatise (even a multivolume one). Therefore, the authors, guided by their own considerations concerning the relative importance of various results, naturally had to be selective in their choice of material. The authors are fully aware that such a selective process is not perfecL Even a number of topics that are, in the authors' opinion, of great importance could not be incJuded, for example, limit theorems for particular cJasses of random processes, the theory of random fields, conditional Markov processes, and information and statistics of random processes. With the publication of this last volume, we recall with gratitude oUf associates who assisted us in this endeavor, and express our sincere thanks to G.N. Sytaya, L.V. Lobanova, P.V. Boiko, N.F. Ryabova, N.A. Skorohod, V.V. Skorohod, N.I. Portenko, and L.I. Gab.

This book is intended as a text for a first course in stochastic processes at the upper undergraduate or graduate levels, assuming only that the reader has had a serious calculus course-advanced calculus would even be better-as well as a first course in probability (without measure theory). In guiding the student from the simplest classical models to some of the spatial models, currently the object of considerable research, the text is aimed at a broad audience of students in biology, engineering, mathematics, and physics. The first two chapters deal with discrete Markov chains-recurrence and tran sience, random walks, birth and death chains, ruin problem and branching pro cesses-and their stationary distributions. These classical topics are treated with a modem twist: in particular, the coupling technique is introduced in the first chap ter and is used throughout. The third chapter deals with continuous time Markov chains-Poisson process, queues, birth and death chains, stationary distributions. The second half of the book treats spatial processes. This is the main difference between this work and

the many others on stochastic processes. Spatial stochas tic processes are (rightly) known as being difficult to analyze. The few existing books on the subject are technically challenging and intended for a mathemat ically sophisticated reader. We picked several interesting models-percolation, cellular automata, branching random walks, contact process on a tree-and con centrated on those properties that can be analyzed using elementary methods.
In the Preface to the first edition, originally published in 1980, we mentioned that this book was based on the author's lectures in the Department of Mechanics and Mathematics of the Lomonosov University in Moscow, which were issued, in part, in mimeographed form under the title "Probabil ity, Statistics, and Stochastic Processors, I, II" and published by that Univer sity. Our original intention in writing the first edition of this book was to divide the contents into three parts: probability, mathematical statistics, and theory of stochastic processes, which corresponds to an outline of a three semester course of lectures for university students of mathematics. However, in the course of preparing the book, it turned out to be impossible to realize this intention completely, since a full exposition would have required too much space. In this connection, we stated in the Preface to the first edition that only probability theory and the theory of random processes with discrete time were really adequately presented. Essentially all of the first edition is reproduced in this second edition. Changes and corrections are, as a rule, editorial, taking into account com ments made by both Russian and foreign readers of the Russian original and ofthe English and Germantranslations [Sll]. The author is grateful to all of these readers for their attention, advice, and helpful criticisms. In this second English edition, new material also has been added, as follows: in Chapter 111, §5, §§7-12; in Chapter IV, §5; in Chapter VII, §§8-10.
Based on a highly popular, well-established course taught by the authors, Stochastic Processes: An Introduction, Second Edition discusses the modeling and analysis of random experiments using the theory of probability. It focuses on the way in which the results or outcomes of experiments vary and evolve over time. The text begins with a review of relevant fundamental probability. It then covers several basic gambling problems, random walks, and Markov chains. The authors go on to develop random processes continuous in time, including Poisson, birth and death processes, and general population models. While focusing on queues, they present an extended discussion on the analysis of associated stationary processes. The book also explores reliability and other random processes, such as branching processes, martingales, and a simple epidemic. The appendix contains key mathematical results for reference. Ideal for a one-semester course on stochastic processes, this concise, updated textbook makes the material accessible to students by avoiding specialized applications and instead highlighting simple applications and examples. The associated website contains Mathematica® and R programs that offer flexibility in creating graphs and performing computations.
The core of this book is a one-year course in probability theory and the theory of

random processes, taught at Princeton University. The book provides a comprehensive exposition of classical probability theory and the theory of random processes.

With updates and enhancements to the incredibly successful first edition, Probability and Random Processes for Electrical and Computer Engineers, Second Edition retains the best aspects of the original but offers an even more potent introduction to probability and random variables and processes. Written in a clear, concise style that illustrates the subject’s relevance to a wide range of areas in engineering and physical and computer sciences, this text is organized into two parts. The first focuses on the probability model, random variables and transformations, and inequalities and limit theorems. The second deals with several types of random processes and queuing theory. New or Updated for the Second Edition: A short new chapter on random vectors that adds some advanced new material and supports topics associated with discrete random processes Reorganized chapters that further clarify topics such as random processes (including Markov and Poisson) and analysis in the time and frequency domain A large collection of new MATLAB®-based problems and computer projects/assignments Each Chapter Contains at Least Two Computer Assignments Maintaining the simplified, intuitive style that proved effective the first time, this edition integrates corrections and improvements based on feedback from students and teachers. Focused on strengthening the reader’s grasp of underlying mathematical concepts, the book combines an abundance of practical applications, examples, and other tools to simplify unnecessarily difficult solutions to varying engineering problems in communications, signal processing, networks, and associated fields.

Designed as a textbook for the B.E./B.Tech. students of Electronics and Communication Engineering, Computer Science and Engineering, Biomedical Engineering and Information Technology, this book provides the fundamental concepts and applications of probability and random processes. Beginning with a discussion on probability theory, the text analyses various types of random processes. Besides, the text discusses in detail the random variables, standard distributions, correlation and spectral densities, and linear systems. The topics are dealt with in a well-organised sequence with proper explanations along with simple mathematical formulations. KEY FEATURES : Gives concise and clear presentation of the concepts. Provides a large number of illustrative examples with step-by-step solutions to help students comprehend the concepts with ease. Includes questions asked in university examinations for the last several years to help students in preparing for examinations. Provides hints and answers to unsolved problems. Incorporates chapter-end exercises to drill the students in self-study.

Probability, Random Processes, and Ergodic Properties is for mathematically inclined information/communication theorists and people working in signal processing. It will also interest those working with random or stochastic processes, including mathematicians, statisticians, and economists. Highlights: Complete tour of book and guidelines for use given in Introduction, so readers can see at a glance the topics of interest. Structures mathematics for an engineering audience, with emphasis on engineering applications. New in the Second Edition: Much of the material has been rearranged and revised for pedagogical reasons. The original first chapter has been split in order to allow a more thorough treatment of basic probability before tackling random processes and dynamical systems. The final chapter has been broken into two pieces to provide separate emphasis on process metrics and the ergodic decomposition of affine functionals. Many classic inequalities are now incorporated into the text, along with proofs; and many citations have been added.

Probability and Random Processes, Second Edition presents pertinent applications to signal processing and communications, two areas of key interest to students and professionals in today's booming communications industry. The book includes unique chapters on narrowband random processes and simulation techniques. It also describes applications in digital communications, information theory, coding theory, image processing, speech analysis, synthesis and recognition, and others. Exceptional exposition and numerous worked out problems make this book extremely readable and accessible. The authors connect the applications discussed in class to the textbook. The new edition contains more real world signal processing and communications applications. It introduces the reader to the basics of probability theory and explores topics ranging from random variables, distributions and density functions to operations on a single random variable. There are also discussions on pairs of random variables; multiple random variables; random sequences and series; random processes in linear systems; Markov processes; and power spectral density. This book is intended for practicing engineers and students in graduate-level courses in the topic. Exceptional exposition and numerous worked out problems make the book extremely readable and accessible The authors connect the applications discussed in class to the textbook The new edition contains more real world signal processing and communications applications Includes an entire chapter devoted to simulation techniques

Probability and Random Processes for Electrical and Computer EngineersCRC Press

A user-friendly introduction for mathematicians to some of the principal stochastic models near the interface of probability and physics.

This book concentrates on some general facts and ideas of the theory of stochastic processes. The topics include the Wiener process, stationary processes, infinitely divisible processes, and Ito stochastic equations. Basics of discrete time martingales are also presented and then used in one way or another throughout the book. Another common feature of the main body of the book is using stochastic integration with respect to random orthogonal measures. In particular, it is used for spectral representation of trajectories of stationary processes and for proving that Gaussian stationary processes with rational spectral densities are components of solutions to stochastic equations. In the case of infinitely divisible processes, stochastic integration allows for obtaining a representation of trajectories through jump measures. The Ito stochastic integral is also introduced as a particular case of stochastic integrals with respect to random orthogonal measures. Although it is not possible to cover even a noticeable portion of the topics listed above in a short book, it is hoped that after having followed the material presented here, the reader will have acquired a good understanding of what kind of results are available and what kind of techniques are used to obtain them. With more than 100 problems included, the book can serve as a text for an introductory course on stochastic processes or for independent study. Other works by this author published by the AMS include, Lectures on Elliptic and

Parabolic Equations in Holder Spaces and Introduction to the Theory of Diffusion Processes.
The second edition enhanced with new chapters, figures, and appendices to cover the new developments in applied mathematical functions This book examines the topics of applied mathematical functions to problems that engineers and researchers solve daily in the course of their work. The text covers set theory, combinatorics, random variables, discrete and continuous probability, distribution functions, convergence of random variables, computer generation of random variates, random processes and stationarity concepts with associated autocovariance and cross covariance functions, estimation theory and Wiener and Kalman filtering ending with two applications of probabilistic methods. Probability tables with nine decimal place accuracy and graphical Fourier transform tables are included for quick reference. The author facilitates understanding of probability concepts for both students and practitioners by presenting over 450 carefully detailed figures and illustrations, and over 350 examples with every step explained clearly and some with multiple solutions. Additional features of the second edition of Probability and Random Processes are: Updated chapters with new sections on Newton-Pepys' problem; Pearson, Spearman, and Kendal correlation coefficients; adaptive estimation techniques; birth and death processes; and renewal processes with generalizations A new chapter on Probability Modeling in Teletraffic Engineering written by Kavitha Chandra An eighth appendix examining the computation of the roots of discrete probability-generating functions With new material on theory and applications of probability, Probability and Random Processes, Second Edition is a thorough and comprehensive reference for commonly occurring problems in probabilistic methods and their applications.
This book develops appreciation of the ingenuity involved in the mathematical treatment of random phenomena, and of the power of the mathematical methods employed in the solution of applied problems. It is intended to students interested in applications of probability to their disciplines.
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Using the Kolmogorov model, this intermediate-level text discusses random variables, probability distributions, mathematical expectation, random processes, more. For advanced undergraduates students of science, engineering, or math. Includes problems with answers and six appendixes. 1965 edition.
Detailed coverage of probability theory, random variables and their functions, stochastic processes, linear system response to stochastic processes, Gaussian and Markov processes, and stochastic differential equations. 1973 edition.
This book provides engineers with focused treatment of the mathematics needed to understand probability, random variables, and stochastic processes, which are essential mathematical disciplines used in communications engineering. The author explains the basic concepts of these topics as plainly as possible so that people with no in-depth knowledge of these mathematical topics can better appreciate their applications in real problems. Applications examples are drawn from various areas of communications. If a reader is interested in understanding probability and stochastic processes that are specifically important for communications networks and systems, this book serves his/her need.
Praise for the First Edition ". . . an excellent textbook ... well organized and neatly written."--Mathematical Reviews ". . . amazingly interesting . . ." -- Technometrics Thoroughly updated to showcase the interrelationships between probability, statistics, and stochastic processes, Probability, Statistics, and Stochastic Processes, Second Edition prepares readers to collect, analyze, and characterize data in their chosen fields. Beginning with three chapters that develop probability theory and introduce the axioms of probability, random variables, and joint distributions, the book goes on to present limit theorems and simulation. The authors

combine a rigorous, calculus-based development of theory with an intuitive approach that appeals to readers' sense of reason and logic. Including more than 400 examples that help illustrate concepts and theory, the Second Edition features new material on statistical inference and a wealth of newly added topics, including: Consistency of point estimators Large sample theory Bootstrap simulation Multiple hypothesis testing Fisher's exact test and Kolmogorov-Smirnov test Martingales, renewal processes, and Brownian motion One-way analysis of variance and the general linear model Extensively class-tested to ensure an accessible presentation, Probability, Statistics, and Stochastic Processes, Second Edition is an excellent book for courses on probability and statistics at the upper-undergraduate level. The book is also an ideal resource for scientists and engineers in the fields of statistics, mathematics, industrial management, and engineering.

Praise for the First Edition ". . . an excellent textbook . . . well organized and neatly written." —Mathematical Reviews ". . . amazingly interesting . . ." —Technometrics Thoroughly updated to showcase the interrelationships between probability, statistics, and stochastic processes, Probability, Statistics, and Stochastic Processes, Second Edition prepares readers to collect, analyze, and characterize data in their chosen fields. Beginning with three chapters that develop probability theory and introduce the axioms of probability, random variables, and joint distributions, the book goes on to present limit theorems and simulation. The authors combine a rigorous, calculus-based development of theory with an intuitive approach that appeals to readers' sense of reason and logic. Including more than 400 examples that help illustrate concepts and theory, the Second Edition features new material on statistical inference and a wealth of newly added topics, including: Consistency of point estimators Large sample theory Bootstrap simulation Multiple hypothesis testing Fisher's exact test and Kolmogorov-Smirnov test Martingales, renewal processes, and Brownian motion One-way analysis of variance and the general linear model Extensively class-tested to ensure an accessible presentation, Probability, Statistics, and Stochastic Processes, Second Edition is an excellent book for courses on probability and statistics at the upper-undergraduate level. The book is also an ideal resource for scientists and engineers in the fields of statistics, mathematics, industrial management, and engineering.

Providing the necessary materials within a theoretical framework, this volume presents stochastic principles and processes, and related areas. Over 1000 exercises illustrate the concepts discussed, including modern approaches to sample paths and optimal stopping.

The long-awaited revision of Fundamentals of Applied Probability and Random Processes expands on the central components that made the first edition a classic. The title is based on the premise that engineers use probability as a modeling tool, and that probability can be applied to the solution of engineering problems. Engineers and students studying probability and random processes also need to analyze data, and thus need some knowledge of statistics. This book is designed to provide students with a thorough grounding in probability and stochastic processes, demonstrate their applicability to real-world problems, and introduce the basics of statistics. The book's clear writing style and homework problems make it ideal for the classroom or for self-study. Demonstrates concepts with more than 100 illustrations, including 2 dozen new drawings Expands readers' understanding of disruptive statistics in a new chapter (chapter 8) Provides new chapter on Introduction to Random Processes with 14 new illustrations and tables explaining key concepts. Includes two chapters devoted to the two branches of statistics, namely descriptive statistics (chapter 8) and inferential (or inductive) statistics (chapter 9).

Probability is an area of mathematics of tremendous contemporary importance across all aspects of human endeavour. This book is a compact account of the basic features of probability and random processes at the level of first and second year mathematics undergraduates and Masters' students in cognate fields. It is suitable for a first course in probability, plus a follow-up course in random processes including Markov chains.Three specialfeatures of this book are its modest size, the fairly broad range of topics covered, and its approach to mathematical rigour: not everything is rigorous, but the need for rigour is explained wherenecessary.This second edition develops the success of the first edition through an updated presentation, an extensive new chapter on Markov chains, and a number of new sections to ensure comprehensive coverage of the syllabi at major universities.

A comprehensive and accessible presentation of probabilityand stochastic processes with emphasis on key theoretical conceptsand real-world applications With a sophisticated approach, Probability and StochasticProcesses successfully balances theory and applications in apedagogical and accessible format. The book's primary focusis on key theoretical notions in probability to provide afoundation for understanding concepts and examples related tostochastic processes. Organized into two main sections, the book begins by developingprobability theory with topical coverage on probability measure;random variables; integration theory; product spaces, conditionaldistribution, and conditional expectations; and limit theorems. Thesecond part explores stochastic processes and related conceptsincluding the Poisson process, renewal processes, Markov chains,semi-Markov processes, martingales, and Brownian motion. Featuringa logical combination of traditional and complex theories as wellas practices, Probability and Stochastic Processes alsoincludes: Multiple examples from disciplines such as business,mathematical finance, and engineering Chapter-by-chapter exercises and examples to allow readers totest their comprehension of the presented material A rigorous treatment of all probability and stochasticprocesses concepts An appropriate textbook for probability and stochastic processescourses at the upper-undergraduate and graduate level inmathematics, business, and electrical engineering, Probabilityand Stochastic Processes is also an ideal reference forresearchers and practitioners in the fields of mathematics,engineering, and finance.

Stochastic Processes for Insurance and Finance offers a thorough yet accessible reference for researchers and practitioners of insurance mathematics. Building on recent and rapid developments in applied probability, the authors describe in general terms models based on Markov processes, martingales and various types of point processes. Discussing frequently asked insurance questions, the authors present a coherent overview of the subject and specifically address: The principal concepts from insurance and finance Practical examples with real life data Numerical and algorithmic procedures essential for modern insurance practices Assuming competence in probability calculus, this book will provide a fairly rigorous treatment of insurance risk theory recommended for researchers and students interested in applied probability as well as practitioners of actuarial sciences. Wiley Series in Probability and Statistics

This applications oriented book features coverage of Markov chains and queuing theory which is of particular interest to communications professionals--a newer area where many professionals will need an update or refresher. It also features computer-based methods and exercises providing the most up-to-date training for those in the fields of telecommunications and computer engineering.

Praise for the First Edition "If there is anything you want to know, or remind yourself, about probabilities, then look no further than this comprehensive, yet wittily written and enjoyable, compendium of how to apply probability calculations in real-world situations." - Keith Devlin, Stanford University, National Public Radio's "Math Guy" and author of The Math Gene and The Unfinished Game From probable improbabilities to regular irregularities, Probabilities: The Little Numbers That Rule Our Lives, Second Edition investigates the often surprising effects of risk and chance in our lives.

Featuring a timely update, the Second Edition continues to be the go-to guidebook for an entertaining presentation on the mathematics of chance and uncertainty. The new edition develops the fundamental mathematics of probability in a unique, clear, and informal way so readers with various levels of experience with probability can understand the little numbers found in everyday life. Illustrating the concepts of probability through relevant and engaging real-world applications, the Second Edition features numerous examples on weather forecasts, DNA evidence, games and gambling, and medical testing. The revised edition also includes: The application of probability in finance, such as option pricing The introduction of branching processes and the extinction of family names An extended discussion on opinion polls and Nate Silver's election predictions Probabilities: The Little Numbers That Rule Our Lives, Second Edition is an ideal reference for anyone who would like to obtain a better understanding of the mathematics of chance, as well as a useful supplementary textbook for students in any course dealing with probability.

This textbook explores probability and stochastic processes at a level that does not require any prior knowledge except basic calculus. It presents the fundamental concepts in a step-by-step manner, and offers remarks and warnings for deeper insights. The chapters include basic examples, which are revisited as the new concepts are introduced. To aid learning, figures and diagrams are used to help readers grasp the concepts, and the solutions to the exercises and problems. Further, a table format is also used where relevant for better comparison of the ideas and formulae. The first part of the book introduces readers to the essentials of probability, including combinatorial analysis, conditional probability, and discrete and continuous random variable. The second part then covers fundamental stochastic processes, including point, counting, renewal and regenerative processes, the Poisson process, Markov chains, queuing models and reliability theory. Primarily intended for undergraduate engineering students, it is also useful for graduate-level students wanting to refresh their knowledge of the basics of probability and stochastic processes.

Students and teachers of mathematics and related fields will find this book a comprehensive and modern approach to probability theory, providing the background and techniques to go from the beginning graduate level to the point of specialization in research areas of current interest. The book is designed for a two- or three-semester course, assuming only courses in undergraduate real analysis or rigorous advanced calculus, and some elementary linear algebra. A variety of applications—Bayesian statistics, financial mathematics, information theory, tomography, and signal processing—appear as threads to both enhance the understanding of the relevant mathematics and motivate students whose main interests are outside of pure areas.

Miller and Childers have focused on creating a clear presentation of foundational concepts with specific applications to signal processing and communications, clearly the two areas of most interest to students and instructors in this course. It is aimed at graduate students as well as practicing engineers, and includes unique chapters on narrowband random processes and simulation techniques. The appendices provide a refresher in such areas as linear algebra, set theory, random variables, and more. Probability and Random Processes also includes applications in digital communications, information theory, coding theory, image processing, speech analysis, synthesis and recognition, and other fields. * Exceptional exposition and numerous worked out problems make the book extremely readable and accessible * The authors connect the applications discussed in class to the textbook * The new edition contains more real world signal processing and communications applications * Includes an entire chapter devoted to simulation techniques

Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. Tough Test Questions? Missed Lectures? Not Enough Time? Fortunately, there's Schaum's. More than 40 million students have trusted Schaum's to help them succeed in the classroom and on exams. Schaum's is the key to faster learning and higher grades in every subject. Each Outline presents all the essential course information in an easy-to-follow, topic-by-topic format. You also get hundreds of examples, solved problems, and practice exercises to test your skills. Schaum's Outline of Probability, Random Variables, and Random Processes, Fourth Edition is packed with hundreds of examples, solved problems, and practice exercises to test your skills. This updated guide approaches the subject in a more concise, ordered manner than most standard texts, which are often filled with extraneous material. Schaum's Outline of Probability, Random Variables, and Random Processes, Fourth Edition features: • 405 fully-solved problems • 22 problem-solving videos • An accessible review of probability and statistics concepts • Clear, concise explanations of probability, random variables, and random processes • Content supplements the major leading textbooks in probability and statistics • Content that is appropriate for Probability, Random Processes, Stochastic Processes, Probability and Random Variables, Introduction to Probability and Statistics courses PLUS: Access to the revised Schaums.com website and new app, containing 22 problem-solving videos, and more. Schaum's reinforces the main concepts required in your course and offers hundreds of practice exercises to help you succeed. Use Schaum's to shorten your study time—and get your best test scores! Schaum's Outlines – Problem solved.