First published in 1975 as the third edition of a 1957 original, this book presents the fundamental ideas of fluid flow, viscosity, heat conduction, diffusion, the energy and momentum principles, and the method of dimensional analysis. These ideas are subsequently developed in terms of their important practical applications, such as flow in pipes and channels, pumps, compressors and heat exchangers. Later chapters deal with the equation of fluid motion, turbulence and the general equations of forced convection. The final section discusses special problems in process engineering, including compressible flow in pipes, solid particles in fluid flow, flow through packed beds, condensation and evaporation. This book will be of value to anyone with an interest in the wider applications of fluid mechanics and heat transfer.

Covered from the vantage point of a user of a commercial flow package, Essentials of Computational Fluid Dynamics provides the information needed to competently operate a commercial flow solver. This book provides a physical description of fluid flow, outlines the strengths and weaknesses of computational fluid dynamics (CFD), presents the basics of the discretization of the equations, focuses on the understanding of how the flow physics interact with a typical finite-volume discretization, and highlights the approximate nature of CFD. It emphasizes how the physical concepts (mass conservation or momentum balance) are reflected in the CFD solutions while minimizing the required mathematical/numerical background. In addition, it uses cases studies in mechanical/aero and biomedical engineering, includes MATLAB and spreadsheet examples, codes and exercise questions. The book also provides practical demonstrations on core principles and key behaviors and incorporates a wide range of colorful examples of CFD simulations in various fields of engineering. In addition, this author: Introduces basic discretizations, the linear advection equation, and forward, backward and central differences Proposes a prototype discretization (first-order upwind) implemented in a spreadsheet/MATLAB example that highlights the diffusive character Looks at consistency, truncation error, and order of accuracy Analyzes the truncation error of the forward, backward, central differences using simple Taylor analysis Demonstrates how the of upwinding produces Artificial Viscosity (AV) and its importance for stability Explains how to select boundary conditions based on physical considerations Illustrates these concepts in a number of carefully discussed case studies Essentials of Computational Fluid Dynamics provides a solid introduction to the basic principles of practical CFD and serves as a resource for students in mechanical or aerospace engineering taking a first CFD course as well as practicing professionals needing a brief, accessible introduction to CFD.

This concise, yet comprehensive book covers the basic concepts and principles of modern fluid mechanics. It examines the fundamental aspects of fluid motion including important fluid properties, regimes of flow, pressure variations in fluids at rest and in motion, methods of flow description and
analysis.

This book is designed to cover the standard topics in a basic fluid mechanics course in a streamlined manner that meets the learning needs of students better than the dense, encyclopedic manner of traditional texts. This approach helps students connect the math and theory to the physical world and practical applications and apply these connections to solving problems. The text lucidly presents basic analysis techniques and addresses practical concerns and applications, such as pipe flow, open-channel flow, flow measurement, and drag and lift. It offers a strong visual approach with photos, illustrations, and videos included in the text, examples and homework problems to emphasize the practical application of fluid mechanics principles.

Hamiltonian fluid dynamics and stability theory work hand-in-hand in a variety of engineering, physics, and physical science fields. Until now, however, no single reference addressed and provided background in both of these closely linked subjects. Introduction to Hamiltonian Fluid Dynamics and Stability Theory does just that—offers a comprehensive

Introduction to Practical Fluid Flow provides information on the solution of practical fluid flow and fluid transportation problems through the application of fluid dynamics. Emphasising the solution of practical operating and design problems, the text concentrates on computer-based methods throughout, in keeping with trends in engineering. With a focus on the flow of slurries and non-Newtonian fluids, it will be useful for and engineering students who have to deal with practical fluid flow problems. Emphasises flow of slurries and Non-Newtonian fluids. Covers the application of fluid dynamics to the solution of practical fluid flow and fluid transportation problems.

Based on the authors’ highly successful text Fundamentals of Fluid Mechanics, A Brief Introduction to Fluid Mechanics, 5th Edition is a streamlined text, covering the basic concepts and principles of fluid mechanics in a modern style. The text clearly presents basic analysis techniques and addresses practical concerns and applications, such as pipe flow, open-channel flow, flow measurement, and drag and lift. Extra problems in every chapter including open-ended problems, problems based on the accompanying videos, laboratory problems, and computer problems emphasize the practical application of principles. More than 100 worked examples provide detailed solutions to a variety of problems.

We inhabit a world of fluids, including air (a gas), water (a liquid), steam (vapour) and the numerous natural and synthetic fluids which are essential to modern-day life. Fluid mechanics concerns the way fluids flow in response to imposed stresses. The subject plays a central role in the education of students of mechanical engineering, as well as chemical engineers, aeronautical and aerospace engineers, and civil engineers. This textbook includes numerous examples of practical applications of the theoretical ideas presented, such as calculating the thrust of a jet engine, the shock- and expansion-wave patterns for supersonic flow over a diamond-shaped aerofoil, the forces created by liquid flow through a pipe bend and/or junction, and the power output of a gas turbine. The first ten chapters of the book are suitable for first-year undergraduates. The latter half covers material suitable for fluid-mechanics courses for upper-level students. Although knowledge of calculus is essential, this text focuses on the underlying physics. The book emphasizes the role of dimensions and dimensional analysis, and includes more material on the flow of non-Newtonian liquids than is usual in a general book on fluid mechanics -- a reminder that the majority of synthetic liquids are non-Newtonian in character.

A Brief Introduction to Fluid Mechanics, 5th Edition is designed to cover the standard topics in a basic fluid mechanics course in a streamlined manner that meets the learning needs of today’s student better than the dense, encyclopedic manner of traditional texts. This approach helps students connect the math and theory to the physical world and practical applications and apply these connections to solving problems. The text lucidly presents basic analysis techniques and addresses practical concerns and applications, such as pipe flow, open-channel flow, flow measurement, and drag and lift. It offers a strong visual approach with photos, illustrations, and videos included in the text, examples and homework problems to emphasize the practical application of fluid mechanics principles.

Mathematical Introduction to Fluid Mechanics presents some selected highlights of currently interesting topics in fluid mechanics in a compact form, as well as providing a concise and appealing exposition of the basic theory of fluid mechanics. The first chapter contains an elementary derivation of the equations, and the concept of vorticity is introduced. The second chapter contains a discussion of potential flow, vortex motion, and boundary layers. A construction of boundary layers using vortex sheets and random
This is an introductory fluid mechanics text, intended for the first Fluid Mechanics course required of all engineers. The goal of this book is to modernise the teaching of fluid mechanics by encouraging students to visualise and simulate flow processes. The book also introduces students to the capabilities of computational fluid dynamics (CFD) techniques, the most important new approach to the study of fluids. Fluid mechanics is traditionally one of the most difficult topics in the curriculum for ME students: this text aims to overcome those learning difficulties through visualisation of the key concepts.

Contents:
1. Fundamental Concepts
   1.1 Introduction
   1.2 Gases
   1.3 Methods of Description
2. Fluid Properties
   2.1 Introduction
   2.2 Mass, Weight and Density
   2.3 Pressure
   2.4 Temperature and Other Thermal Properties
3. The Perfect Gas Law
4. Bulk Compressibility
5. Viscosity
6. Surface Tension
7. Fluid Energy
8. Bernoulli’s Equation
9. Dimensional Analysis and Similitude
10. Momentum Equation
11. Constitutive Model for a Newtonian Fluid
12. Steady Viscous Flow
13. Flow in Pipes and Ducts
14. One-dimensional Gas Flow
15. Fluid Transport
16. Navier-Stokes Equations
17. Flow Under a Sluice Gate
18. Flow over a Weir

Through ten editions, Fox and McDonald’s Introduction to Fluid Mechanics has helped students understand the physical concepts, basic principles, and analysis methods of fluid mechanics. This market-leading textbook provides a balanced, systematic approach to mastering critical concepts with the proven Fox-McDonald solution methodology. In-depth yet accessible chapters present governing equations, clearly state assumptions, and relate mathematical results to corresponding physical behavior. Emphasis is placed on the use of control volumes to support a practical, theoretically-inclusive problem-solving approach to the subject. Each comprehensive chapter includes numerous, easy-to-follow examples that illustrate good solution technique and explain challenging points. A broad range of carefully selected topics describe how to apply the governing equations to various problems, and explain physical concepts to enable students to model real-world fluid flow situations. Topics include flow measurement, dimensional analysis and similitude, flow in pipes, ducts, and open channels, fluid machinery, and more. To enhance student learning, the book incorporates numerous pedagogical features including chapter summaries and learning objectives, end-of-chapter problems, useful equations, and design and open-ended problems that encourage students to apply fluid mechanics principles to the design of devices and systems.
BASIC Fluid Mechanics combines the application of BASIC programming with fluid mechanics. Topics covered in this book include the fundamentals of the BASIC computer language, properties of fluids, fluid statics, kinematics, and conservation of energy. Force and momentum, viscous flow, flow measurement, and dimensional analysis and similarity are also considered. This book is comprised of nine chapters and begins with a brief introduction to the application of BASIC. The discussion then turns to the various properties of a fluid and the differences between fluids and solids. The chapters that follow explore fluid statics, kinematics, and conservation of energy. The Euler and Bernoulli equations that are used to express the principle of conservation of energy when applied to fluids are highlighted, and calculations for force and momentum are presented. The text also considers laminar flow between parallel plates and in circular tubes, as well as the techniques for measuring flow. The final chapter describes the principles of dimensional analysis and similarity methods. Worked examples developing programs for the solution of typical problems are provided at the end of each chapter. This monograph will be useful to students in an undergraduate program and practicing engineers who are attempting to get to grips with modern computational procedures.

Introduction to Fluid Mechanics is a mathematically efficient introductory text for a basal course in mechanical engineering. More rigorous than existing texts in the field, it is also distinguished by the choice and order of subject matter, its careful derivation and explanation of the laws of fluid mechanics, and its attention to everyday examples of fluid flow and common engineering applications. Beginning with the simple and proceeding to the complex, the text introduces the principles of fluid mechanics in orderly steps. At each stage practical engineering problems are solved, principally in engineering systems such as dams, pumps, turbines, pipe flows, propellers, and jets, but with occasional illustrations from physiological and meteorological flows. The approach builds on the student’s experience with everyday fluid mechanics, showing how the scientific principles permit a quantitative understanding of what is happening and provide a basis for designing engineering systems that achieve the desired objectives. Introduction to Fluid Mechanics differs from most engineering texts in several respects: The derivations of the fluid principles (especially the conservation of energy) are complete and correct, but concisely given through use of the theorems of vector calculus. This saves considerable time and enables the student to visualize the significance of these principles. More attention than usual is given to unsteady flows and their importance in pipe flow and external flows. Finally, the examples and exercises illustrate real engineering situations, including physically realistic values of the problem variables. Many of these problems require calculation of numerical values, giving the student experience in judging the correctness of his or her numerical skills.

Introduction to Fluid Mechanics, Fifth Edition uses equations to model phenomena that we see and interact with every day. Placing emphasis on solved practical problems, this book introduces circumstances that are likely to occur in practice—reflecting real-life situations that involve fluids in motion. It examines the equations of motion for turbulent flow, the flow of a nonviscous or inviscid fluid, and laminar and turbulent boundary-layer flows. The new edition contains new sections on experimental methods in fluids, presents new and revised examples and chapter problems, and includes problems utilizing computer software and spreadsheets in each chapter. The book begins with the fundamentals, addressing fluid statics and describing the forces present in fluids at rest. It examines the forces that are exerted on a body moving through a fluid, describes the effects that cause lift and drag forces to be exerted on immersed bodies, and examines the variables that are used to mathematically model open-channel flow. It discusses the behavior of fluids while they are flowing, covers the basic concepts of compressible flow (flowing gases), and explains the application of the basic concepts of incompressible flow in conduits. This book presents the control volume concept; the continuity, momentum, energy, and Bernoulli equations; and the Rayleigh, Buckingham pi, and inspection methods. It also provides friction factor equations for the Moody diagram, and includes correlations for coiled and internally finned tubes. In addition, the author: Concludes each chapter with a problems section. Groups the end-of-chapter problems together by topic. Arranges problems so that the easier ones are presented first. Introduction to Fluid Mechanics, Fifth Edition offers a basic analysis of fluid mechanics designed for a first course in fluids. This latest edition adds coverage of experimental methods in fluid mechanics, and contains new and updated examples that can aid in understanding and applying the equations of fluid mechanics to common, everyday problems.

This book presents the foundations of fluid mechanics and transport phenomena in a concise way. It is suitable as an introduction to the subject as it contains many examples, proposed problems and a chapter for self-evaluation.

Featuring easy-to-understand explanations of theory and underlying mathematics principles, this book provides readers with a complete introduction to fluid power, including hydraulics and pneumatics. The differences and similarities between hydraulics and pneumatics are identified, allowing readers to leverage their knowledge en route to new skills. Detailed color illustrations, photographs, and color-enhanced schematics are used effectively to add clarity to discussion of the construction and function of components. A dedicated section on component specifications is featured in each chapter, while realistic numbers are used and problems are stated in such a way as to develop practical system design skills. Knowledge of college-level algebra is assumed, but no trigonometry or calculus is required, making this book ideal for the technologist. Nomenclature, metric prefixes and conversion factors, equations, and graphic symbols are located in handy appendices for use by readers as they progress through the book. An introduction to the industry, plus a comprehensive glossary, is also included for the benefit of those who are just beginning their study of fluid power.

Market_Desc: · Mechanical, Chemical and Aerospace Engineers· Professors in mechanical engineering· Students Special Features: · Contains complete tabulated fluid property data that present density and viscosity data for important fluids as functions of temperature without the need to interpolate from graphs· Complete and thorough coverage of the mathematics that underlies fluid mechanics· Addition of problems that emphasize computer applications About The Book: This successful book presents the fundamentals of fluid mechanics clearly and succinctly. Knowledge of fluid flow is essential to industries involving heat transfer, chemical processes, and aerodynamics. The book makes use of a problem-solving methodology and includes outstanding example problems. Topics covered are flow fields; potential theory and boundary layer theory; Bernoulli's Equation, Dimensional Analysis. One of the bestselling books in the field, Introduction to Fluid Mechanics continues to provide readers with a balanced and comprehensive approach to mastering critical concepts. The new seventh edition once again incorporates a proven problem-solving methodology that will help them develop an orderly plan to finding the right solution. It starts with basic equations, then clearly states assumptions, and finally, relates results to expected physical behavior. Many of the steps involved in analysis are simplified by using Excel.

This is the most comprehensive introductory graduate or advanced undergraduate text in fluid mechanics available. It builds from the fundamentals, often in a very general way, to widespread applications to technology and geophysics. In most areas, an understanding of this book can be followed up by specialized monographs and the research literature. The material added to this new edition will provide insights gathered over 45 years of studying fluid mechanics. Many of these insights, such as universal dimensionless similarity scaling for the laminar boundary layer equations, are available nowhere else. Likewise for the generalized vector field derivatives. Other material, such as the generalized stream function treatment, shows how stream functions may be used in three-dimensional flows. The CFD chapter enables computations of some simple flows and provides entrée to more advanced literature. *New and generalized treatment of similar laminar boundary layers. *Generalized treatment of streamfunctions for three-dimensional flow. *Generalized treatment of vector field derivatives. *Expanded coverage of gas dynamics. *New introduction to computational fluid dynamics. *New generalized treatment of boundary conditions in fluid mechanics. *Expanded treatment of viscous flow with more examples.

Designed for introductory undergraduate courses in fluid mechanics for chemical engineers, this stand-alone textbook illustrates the fundamental concepts and analytical strategies in a rigorous and systematic, yet mathematically accessible manner. Using both traditional and novel applications, it examines key topics such as viscous stresses, surface tension, and the microscopic analysis of incompressible flows which enables students to understand what is important physically in a novel situation and how to use such insights in modeling. The many modern worked examples and end-of-chapter problems provide calculation practice, build confidence in analyzing physical systems, and help develop engineering judgment. The book also features a self-contained summary of the mathematics needed to understand vectors and tensors, and explains solution methods for partial differential equations. Including a full solutions manual for instructors available at www.cambridge.org/deen,
balanced textbook is the ideal resource for a one-semester course.

Fluid mechanics is often seen as a difficult subject due to the necessity to visualizing complex flow patterns and fluid behavior required by high level mathematics. This comprehensive resource overcomes this difficulty by introducing concepts through everyday examples before moving on to more involved mathematics.

The leading reference for the diagnosis and management of fluid, electrolyte, and acid-base imbalances in small animals, Fluid, Electrolyte, and Acid-Base Disorders in Small Animal Practice, 4th Edition provides cutting-edge, evidence-based guidelines to enhance your care of dogs and cats. Information is easy to find and easy to use, with comprehensive coverage including fluid and electrolyte physiology and pathophysiology and their clinical applications, as well as the newest advances in fluid therapy and a discussion of a new class of drugs called vaptans. Lead author Stephen DiBartola is a well-known speaker and the "go-to" expert in this field, and his team of contributors represents the most authoritative and respected clinicians and academicians in veterinary medicine. Over 30 expert contributors represent the "cream of the crop" in small animal medicine, ensuring that this edition provides the most authoritative and evidence-based guidelines. Scientific, evidence-based insights and advances integrate basic physiological principles into practice, covering patient evaluation, differential diagnosis, normal and abnormal clinical features and laboratory test results, approaches to therapy, technical aspects of therapy, patient monitoring, assessing risk, and prediction of outcomes for each disorder. Hundreds of tables, algorithms, and schematic drawings demonstrate the best approaches to diagnosis and treatment, highlighting the most important points in an easy-access format. Drug and dosage recommendations are included with treatment approaches in the Electrolyte Disorders section. Clear formulas in the Fluid Therapy section make it easier to determine the state of dehydration, fluid choice, and administration rate and volume in both healthy and diseased patients. Updated chapters cover the latest advances in fluid therapy in patient management, helping you understand and manage a wide range of potentially life-threatening metabolic disturbances. Expanded Disorders of Sodium and Water chapter includes information on a new class of drugs called vaptans, vasopressin receptor antagonists that may soon improve the ability to manage patients with chronic hyponatremia. Hundreds of new references cover the most up-to-date advances in fluid therapy, including renal failure and shock syndromes.

A Brief Introduction to Fluid Mechanics, 5th Edition is designed to cover the standard topics in a basic fluid mechanics course in a streamlined manner that meets the learning needs of today’s student better than the dense, encyclopedic manner of traditional texts. This approach helps students connect the math and theory to the physical world and practical applications and apply these connections to solving problems. The text lucidly presents basic analysis techniques and addresses practical concerns and applications, such as pipe flow, open-channel flow, flow measurement, and drag and lift. It offers a strong visual approach with photos, illustrations, and videos included in the text, examples and homework problems to emphasize the practical application of fluid mechanics principles.

This textbook provides a concise introduction to the mathematical theory of fluid motion with the underlying physics. Different branches of fluid mechanics are developed from general to specific topics. At the end of each chapter carefully designed problems are assigned as homework, for which selected fully worked-out solutions are provided. This book can be used for self-study, as well as in conjunction with a course in fluid mechanics.

Introduction to Fluid Mechanics, Sixth Edition, is intended to be used in a first course in Fluid Mechanics, taken by a range of engineering majors. The text begins with dimensions, units, and fluid properties, and continues with derivations of key equations used in the control-volume approach. Step-by-step examples focus on everyday situations, and applications. These include flow with friction through pipes and tubes, flow past various two and three dimensional objects, open channel flow, compressible flow, turbomachinery and experimental methods. Design projects give readers a sense of what they will encounter in industry. A solutions manual and figure slides are available for instructors.

Excellent coverage of kinematics, momentum principle, Newtonian fluid, rotating fluids, compressibility, and more. Geared toward advanced undergraduate and graduate students of mathematics and science; prerequisites include calculus and vector analysis. 1971 edition.

Both broad and deep in coverage, Rubenstein shows that fluid mechanics principles can be applied not only to blood circulation, but also to air flow through the lungs, joint lubrication, intraocular fluid
movement and renal transport. Each section initiates discussion with governing equations, derives the state equations and then shows examples of their usage. Clinical applications, extensive worked examples, and numerous end of chapter problems clearly show the applications of fluid mechanics to biomedical engineering situations. A section on experimental techniques provides a springboard for future research efforts in the subject area. Uses language and math that is appropriate and conducive for undergraduate learning, containing many worked examples and end of chapter problems. All engineering concepts and equations are developed within a biological context. Covers topics in the traditional biofluids curriculum, as well as addressing other systems in the body that can be described by biofluid mechanics principles, such as air flow through the lungs, joint lubrication, intraocular fluid movement, and renal transport. Clinical applications are discussed throughout the book, providing practical applications for the concepts discussed.

Fluid-Solid Interaction Dynamics: Theory, Variational Principles, Numerical Methods and Applications gives a comprehensive accounting of fluid-solid interaction dynamics, including theory, numerical methods and their solutions for various FSI problems in engineering. The title provides the fundamental theories, methodologies and results developed in the application of FSI dynamics. Four numerical approaches that can be used with almost all integrated FSI systems in engineering are presented. Methods are linked with examples to illustrate results. In addition, numerical results are compared with available experiments or numerical data in order to demonstrate the accuracy of the approaches and their value to engineering applications. The title gives readers the state-of-the-art in theory, variational principles, numerical modeling and applications for fluid-solid interaction dynamics. Readers will be able to independently formulate models to solve their engineering FSI problems using information from this book. Presents the state-of-the-art in fluid-solid interaction dynamics, providing theory, method and results. Takes an integrated approach to formulate, model and simulate FSI problems in engineering. Illustrates results with concrete examples. Gives four numerical approaches and related theories that are suitable for almost all integrated FSI systems. Provides the necessary information for bench scientists to independently formulate, model, and solve physical FSI problems in engineering.

Good, No Highlights, No Markup, all pages are intact, Slight Shelfwear, may have the corners slightly dented, may have slight color changes/slightly damaged spine.

This is a modern and elegant introduction to engineering fluid mechanics enriched with numerous examples, exercises and applications. A swollen creek tumbles over rocks and through crevasses, swirling and foaming. Taffy can be stretched, reshaped and twisted in various ways. Both the water and the taffy are fluids and their motions are governed by the laws of nature. The aim of this textbook is to introduce the reader to the analysis of flows using the laws of physics and the language of mathematics. We delve deeply into the mathematical analysis of flows; knowledge of the patterns fluids form and why they are formed and also the stresses fluids generate and why they are generated is essential to designing and optimising modern systems and devices. Inventions such as helicopters and lab-on-a-chip reactors would never have been designed without the insight provided by mathematical models.

Uncover Effective Engineering Solutions to Practical Problems. With its clear explanation of fundamental principles and emphasis on real world applications, this practical text will motivate readers to learn. The author connects theory and analysis to practical examples drawn from engineering practice. Readers get a better understanding of how they can apply these concepts to develop engineering answers to various problems. By using simple examples that illustrate basic principles and more complex examples representative of engineering applications throughout the text, the author also shows readers how fluid mechanics is relevant to the engineering field. These examples will help them develop problem-solving skills, gain physical insight into the material, learn how and when to use approximations and make assumptions, and understand when these approximations might break down. Key Features of the Text: * The underlying physical concepts are highlighted rather than focusing on the mathematical equations. * Dimensional reasoning is emphasized as well as the interpretation of the results. * An introduction to engineering in the environment is included to spark reader interest. * Historical references throughout the chapters provide readers with the rich history of fluid mechanics.

The objective of this introductory text is to familiarise students with the basic elements of fluid mechanics so that they will be familiar with the jargon of the discipline and the expected results. At the
same time, this book serves as a long-term reference text, contrary to the oversimplified approach occasionally used for such introductory courses. The second objective is to provide a comprehensive foundation for more advanced courses in fluid mechanics (within disciplines such as mechanical or aerospace engineering). In order to avoid confusing the students, the governing equations are introduced early, and the assumptions leading to the various models are clearly presented. This provides a logical hierarchy and explains the interconnectivity between the various models. Supporting examples demonstrate the principles and provide engineering analysis tools for many engineering calculations.

The authors clearly present basic analysis techniques and address practical concerns and applications, such as pipe flow, open-channel flow, flow measurement, and drag and lift. Homework problems in every chapter—including open-ended problems, problems based on the CD-ROM videos, laboratory problems, and computer problems—emphasize the practical application of principles. More than 100 worked examples provide detailed solutions to a variety of problems.

Copyright code: 084bda97a04732a1bb31e8b83572fbfa