

Cengel Boles Thermodynamics Third Edition

With new chapters, homework problems, case studies, figures, and examples, *Ballistics: Theory and Design of Guns and Ammunition, Third Edition* encourages superior design and innovative applications in the field of ballistics. It examines the analytical and computational tools for predicting a weapon's behavior in terms of pressure, stress, and velocity, demonstrating their applications in ammunition and weapons design. New coverage in the Third Edition includes gas-powered guns, and naval ordinance. With its thorough coverage of interior, exterior and terminal ballistics, this new edition continues to be the standard resource for those studying the technology of guns and ammunition.

Generalized van der Waals Theory of Molecular Fluids in Bulk and at Surfaces presents successful research on the development of a new density theory of fluids that makes it possible to understand and predict a wide range of properties and phenomena. The book brings together recent advances relating to the Generalized van der Waals Theory and its use in fluid property calculations. The mathematics presentation is oriented to an audience of varying backgrounds, and readers will find exercises that can be used as a textbook for a course at the upper undergraduate or graduate level in physics or chemistry. In addition, it is ideal for scientists from other areas, such as geophysics, oceanography and molecular biology who are interested in learning about, and understanding, molecular fluids. Presents an approximate, but fully derived and physically explained, theory of molecular fluids to facilitate broad applications Derives a density functional theory of classical fluids and applies it to obtain equations of state, as well as non-uniform fluid properties, e.g., surface tension and adsorption Demonstrates how the theory can be applied to complex multi-center molecules forming a polymer fluid Provides user-friendly programs to redraw figures for variable parameters and to perform calculations in particular applications Includes a set of exercises to support use of the book in a course

Advanced Thermodynamics Engineering, Second Edition is designed for readers who need to understand and apply the engineering physics of thermodynamic concepts. It employs a self-teaching format that reinforces presentation of critical concepts, mathematical relationships, and equations with concrete physical examples and explanations of applications—to help readers apply principles to their own real-world problems. *Less Mathematical/Theoretical Derivations—More Focus on Practical Application* Because both students and professionals must grasp theory almost immediately in this ever-changing electronic era, this book—now completely in decimal outline format—uses a phenomenological approach to problems, making advanced concepts easier to understand. After a decade teaching advanced thermodynamics, the authors infuse their own style and tailor content based on their observations as professional engineers, as well as feedback from their students. Condensing more esoteric material to focus on practical uses for this continuously evolving area of science, this book is filled with revised problems and extensive tables on thermodynamic properties and other useful information. The authors include an abundance of examples, figures, and illustrations to clarify presented ideas, and additional material and software tools are available for download. The result is a powerful, practical instructional tool that gives readers a strong conceptual foundation on which to build a solid,

functional understanding of thermodynamics engineering.

This book is an introduction to techniques and applications of optical methods for materials Characterization in civil and environmental engineering. Emphasizing chemical sensing and diagnostics, it is written for students and researchers studying the physical and chemical processes in manmade or natural materials. Optical Phenomenology and Applications - Health Monitoring for Infrastructure Materials and the Environment, describes the utility of optical-sensing technologies in applications that include monitoring of transport processes and reaction chemistries in materials of the infrastructure and the subsurface environment. Many of the applications reviewed will address long standing issues in infrastructure health monitoring such as the alkali silica reaction, the role of pH in materials degradation, and the remote and inset characterization of the subsurface environment. The remarkable growth in photonics has contributed immensely to transforming bench-top optical instruments to compact field deployable systems. This has also contributed to optical sensors for environmental sensing and infrastructure health monitoring. Application of optical waveguides and full field imaging for civil and environmental engineering application is introduced and chemical and physical recognition strategies are presented; this is followed by range of field deployable applications. Emphasizing system robustness, and long-term durability, examples covered include in-situ monitoring of transport phenomena, imaging degradation chemistries, and remote sensing of the subsurface ground water.

Energy Technology and Directions for the Future presents the fundamentals of energy for scientists and engineers. It is a survey of energy sources that will be available for use in the 21st century energy mix. The reader will learn about the history and science of several energy sources as well as the technology and social significance of energy. Themes in the book include thermodynamics, electricity distribution, geothermal energy, fossil fuels, solar energy, nuclear energy, alternate energy (wind, water, biomass), energy and society, energy and the environment, sustainable development, the hydrogen economy, and energy forecasting. The approach is designed to present an intellectually rich and interesting text that is also practical. This is accomplished by introducing basic concepts in the context of energy technologies and, where appropriate, in historical context. Scientific concepts are used to solve concrete engineering problems. The technical level of presentation presumes that readers have completed college level physics with calculus and mathematics through calculus of several variables. The selection of topics is designed to provide the reader with an introduction to the language, concepts and techniques used in all major energy components that are expected to contribute to the 21st century energy mix. Future energy professionals will need to understand the origin and interactions of these energy components to thrive in an energy industry that is evolving from an industry dominated by fossil fuels to an industry working with many energy sources. Presents the fundamentals of energy production for engineers, scientists, engineering professors, students, and anyone in the field who needs a technical discussion of energy topics. Provides engineers with a valuable expanded knowledge base using the U.S. National Academy of Sciences content standards. Examines the energy options for the twenty-first century as older energy sources quickly become depleted.

Introduces the concept of combined cycles for next generation nuclear power plants, explaining how recent advances in gas

turbines have made these systems increasingly desirable for efficiency gains and cost-of-ownership reduction. Promulgates modelling and analysis techniques to identify opportunities for increased thermodynamic efficiency and decreased water usage over current Light Water Reactor (LWR) systems. Examines all power conversion aspects, from the fluid exiting the reactor to energy releases into the environment, with special focus on heat exchangers and turbo-machinery. Provides examples of small projects to facilitate nuanced understanding of the theories and implementation of combined-cycle nuclear plants. This book explores combined cycle driven efficiency of new nuclear power plants and describes how to model and analyze a nuclear heated multi-turbine power conversion system operating with atmospheric air as the working fluid. The included studies are intended to identify paths for future work on next generation nuclear power plants (GEN-IV), leveraging advances in natural-gas-fired turbines that enable coupling salt-cooled, helium-cooled, and sodium-cooled reactors to a Nuclear Air-Brayton Combined Cycle (NACC). These reactors provide the option of operating base-load nuclear plants with variable electricity output to the grid using natural gas or stored heat to produce peak power. The author describes overall system architecture, components and detailed modelling results of Brayton-Rankine Combined Cycle power conversion systems and Recuperated Brayton Cycle systems, since they offer the highest overall energy conversion efficiencies. With ever-higher temperatures predicted in GEN-IV plants, this book's investigation of potential avenues for thermodynamic efficiency gains will be of great interest to nuclear engineers and researchers, as well as power plant operators and students.

Engineering students in a wide variety of engineering disciplines from mechanical and chemical to biomedical and materials engineering must master the principles of transport phenomena as an essential tool in analyzing and designing any system or systems wherein momentum, heat and mass are transferred. This textbook was developed to address that need, with a clear presentation of the fundamentals, ample problem sets to reinforce that knowledge, and tangible examples of how this knowledge is put to use in engineering design. Professional engineers, too, will find this book invaluable as reference for everything from heat exchanger design to chemical processing system design and more. * Develops an understanding of the thermal and physical behavior of multiphase systems with phase change, including microscale and porosity, for practical applications in heat transfer, bioengineering, materials science, nuclear engineering, environmental engineering, process engineering, biotechnology and nanotechnology * Brings all three forms of phase change, i.e., liquid vapor, solid liquid and solid vapor, into one volume and describes them from one perspective in the context of fundamental treatment * Presents the generalized integral and differential transport phenomena equations for multi-component multiphase systems in local instance as well as averaging formulations. The molecular approach is also discussed with the connection between microscopic and molecular approaches * Presents basic principles of analyzing transport phenomena in multiphase systems with emphasis on melting, solidification, sublimation, vapor deposition, condensation, evaporation, boiling and two-phase flow heat transfer at the micro and macro levels * Solid/liquid/vapor interfacial phenomena, including the concepts of surface tension, wetting phenomena, disjoining pressure, contact angle, thin films and capillary phenomena, including interfacial balances for mass, species, momentum, and energy for multi-component and

multiphase interfaces are discussed * Ample examples and end-of-chapter problems, with Solutions Manual and PowerPoint presentation available to the instructors

This textbook comprehensively covers the fundamentals and advanced concepts of thermodynamics in a single volume. It provides a detailed discussion of advanced concepts that include energy efficiency, energy sustainability, energy security, organic Rankine cycle, combined cycle power plants, combined cycle power plant integrated with organic Rankine cycle and absorption refrigeration system, integrated coal gasification combined cycle power plants, energy conservation in domestic refrigerators, and next-generation low-global warming potential refrigerants. Pedagogical features include solved problems and unsolved exercises interspersed throughout the text for better understanding. This textbook is primarily written for senior undergraduate students in the fields of mechanical, automobile, chemical, civil, and aerospace engineering for courses on engineering thermodynamics/thermodynamics and for graduate students in thermal engineering and energy engineering for courses on advanced thermodynamics. It is accompanied by teaching resources, including a solutions manual for instructors. FEATURES Provides design and experimental problems for better understanding Comprehensively discusses power cycles and refrigeration cycles and their advancements Explores the design of energy-efficient buildings to reduce energy consumption Property tables, charts, and multiple-choice questions comprise appendices of the book and are available at <https://www.routledge.com/9780367646288>.

Developed from the author's graduate-level course on advanced mechanics of composite materials, Finite Element Analysis of Composite Materials with Abaqus™ shows how powerful finite element tools address practical problems in the structural analysis of composites. Unlike other texts, this one takes the theory to a hands-on level by actually solving problems. It explains the concepts involved in the detailed analysis of composites, the mechanics needed to translate those concepts into a mathematical representation of the physical reality, and the solution of the resulting boundary value problems using the commercial finite element analysis software Abaqus. The first seven chapters provide material ideal for a one-semester course. Along with offering an introduction to finite element analysis for readers without prior knowledge of the finite element method (FEM), these chapters cover the elasticity and strength of laminates, buckling analysis, free edge stresses, computational micromechanics, and viscoelastic models and composites. Emphasizing hereditary phenomena, the book goes on to discuss continuum and discrete damage mechanics as well as delaminations. More than 50 fully developed examples are interspersed with the theory, more than 75 exercises are included at the end of each chapter, and more than 50 separate pieces of Abaqus pseudocode illustrate the solution of example problems. The author's website offers the relevant Abaqus and MATLAB® model files available for download, enabling readers to easily reproduce the examples and complete the exercises. The text also shows readers how to extend the capabilities of Abaqus via "user subroutines" and Python scripting.

Numerous books have been written about Toyota's approach to workplace improvement; however, most describe Toyota's practices as case studies or stories. Designed to aid in the implementation of Lean manufacturing, *The Modern Theory of the Toyota Production System: A Systems Inquiry of the World's Most Emulated and Profitable Management System* explains that your organization already has what it takes to succeed with TPS and what's probably missing is balance. Bridging the gap between implementation and theory, this text is the first of its kind to use systems theory to study how the pieces of the Toyota Production System (TPS) work together to achieve this much needed balance. Lean practitioners will learn how to use system theory to improve overall decision making when applying Lean or Toyota-like management systems. Explaining that the glue that holds the pieces of TPS together is just as important as the pieces themselves, the book provides you with invaluable guidance in the implementation of Lean manufacturing from a management perspective. It outlines a blueprint to help you develop a clear understanding of how the pieces of TPS need to come together so you can achieve something greater than what's possible with the individual pieces.

Thermodynamics is the science that describes the behavior of matter at the macroscopic scale, and how this arises from individual molecules. As such, it is a subject of profound practical and fundamental importance to many science and engineering fields. Despite extremely varied applications ranging from nanomotors to cosmology, the core concepts of thermodynamics such as equilibrium and entropy are the same across all disciplines. *A Conceptual Guide to Thermodynamics* serves as a concise, conceptual and practical supplement to the major thermodynamics textbooks used in various fields. Presenting clear explanations of the core concepts, the book aims to improve fundamental understanding of the material, as well as homework and exam performance. Distinctive features include: Terminology and Notation Key: A universal translator that addresses the myriad of conventions, terminologies, and notations found across the major thermodynamics texts. Content Maps: Specific references to each major thermodynamic text by section and page number for each new concept that is introduced. Helpful Hints and Don't Try Its: Numerous useful tips for solving problems, as well as warnings of common student pitfalls. Unique Explanations: Conceptually clear, mathematically fairly simple, yet also sufficiently precise and rigorous. A more extensive set of reference materials, including older and newer editions of the major textbooks, as well as a number of less commonly used titles, is available online at <http://www.conceptualthermo.com>. Undergraduate and graduate students of chemistry, physics, engineering, geosciences and biological sciences will benefit from this book, as will students preparing for graduate school entrance exams and MCATs.

Thermodynamics An Engineering Approach

The job interview is probably the most important step you will take in your job search journey. Because it's always

important to be prepared to respond effectively to the questions that employers typically ask at a job interview Petrogav International has prepared this eBooks that will help you to get a job in oil and gas industry. Since these questions are so common, hiring managers will expect you to be able to answer them smoothly and without hesitation. This eBook contains 200 questions and answers for job interview and as a BONUS web addresses to 230 video movies for a better understanding of the technological process. This course covers aspects like HSE, Process, Mechanical, Electrical and Instrumentation & Control that will enable you to apply for any position in the Oil and Gas Industry.

Designing structures using composite materials poses unique challenges due especially to the need for concurrent design of both material and structure. Students are faced with two options: textbooks that teach the theory of advanced mechanics of composites, but lack computational examples of advanced analysis; and books on finite element analysis that may or may not demonstrate very limited applications to composites. But now there is third option that makes the other two obsolete: Ever J. Barbero's Finite Element Analysis of Composite Materials. By layering detailed theoretical and conceptual discussions with fully developed examples, this text supplies the missing link between theory and implementation. In-depth discussions cover all of the major aspects of advanced analysis, including three-dimensional effects, viscoelasticity, edge effects, elastic instability, damage, and delamination. More than 50 complete examples using mainly ANSYSTM, but also including some use of MATLAB®, demonstrate how to use the concepts to formulate and execute finite element analyses and how to interpret the results in engineering terms. Additionally, the source code for each example is available for download online. Cementing applied computational and analytical experience to a firm foundation of basic concepts and theory, Finite Element Analysis of Composite Materials offers a modern, practical, and versatile classroom tool for today's engineering classroom.

This book uses different mathematical tools that we learned in high school and in college to solve in detail one hundred everyday problems from credit card interest, basal metabolic rate to earthquake magnitude.

Accompanying DVD-ROM contains the Limited Academic Version of EES (Engineering Equation Solver) software with scripted solutions to selected text problems.

Completely revised and updated, Principles of Sustainable Energy Systems, Second Edition presents broad-based coverage of sustainable energy sources and systems. The book is designed as a text for undergraduate seniors and first-year graduate students. It focuses on renewable energy technologies, but also treats current trends such as the expanding use of natural gas from fracking and development of nuclear power. It covers the economics of sustainable energy, both from a traditional monetary as well as from an energy return on energy invested (EROI) perspective. The book provides complete and up-to-date coverage of all renewable technologies, including solar and wind power, biological processes such as anaerobic digestion and geothermal energy. The new edition also examines social issues such as food, water, population, global warming, and public policies of engineering concern. It discusses energy transition—the process by which renewable

energy forms can effectively be introduced into existing energy systems to replace fossil fuels. See What's New in the Second Edition: Extended treatment of the energy and social issues related to sustainable energy Analytic models of all energy systems in the current and future economy Thoroughly updated chapters on biomass, wind, transportation, and all types of solar power Treatment of energy return on energy invested (EROI) as a tool for understanding the sustainability of different types of resource conversion and efficiency projects Introduction of the System Advisor Model (SAM) software program, available from National Renewable Energy Lab (NREL), with examples and homework problems Coverage of current issues in transition engineering providing analytic tools that can reduce the risk of unsustainable fossil resource use Updates to all chapters on renewable energy technology engineering, in particular the chapters dealing with transportation, passive design, energy storage, ocean energy, and bioconversion Written by Frank Kreith and Susan Krumdieck, this updated version of a successful textbook takes a balanced approach that looks not only at sustainable energy sources, but also provides examples of energy storage, industrial process heat, and modern transportation. The authors take an analytical systems approach to energy engineering, rather than the more general and descriptive approach usually found in textbooks on this topic.

ICIEMS 2013 is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Industrial Engineering and Management Science. This conference provides opportunities for the delegates to exchange new ideas and experiences face to face, to establish business or research relations and to find global partners for future collaboration.

Statistical Thermodynamics: An Engineering Approach covers in a practical, readily understandable manner the underlying meaning of entropy, temperature and other thermodynamic concepts, the foundations of quantum mechanics, and the physical basis of gas, liquid and solid phase properties. It presents simply the relationship between macroscopic and microscopic thermodynamics. In addition, the molecular basis of transport phenomena and chemical kinetics are explored as are basic concepts in spectroscopy. Modern computational tools for solving thermodynamic problems are explored, and the student is assured that he or she will gain knowledge of practical usefulness. This essential text is suitable for mechanical or aerospace engineering graduate students who have a strong background in engineering thermodynamics, those entering advanced fields such as combustion, high temperature gas dynamics, environmental sciences, or materials processing and those who wish to build a background for understanding advanced experimental diagnostic techniques in these or similar fields.

First published in 1995, The Engineering Handbook quickly became the definitive engineering reference. Although it remains a bestseller, the many advances realized in traditional engineering fields along with the emergence and rapid growth of fields such as biomedical engineering, computer engineering, and nanotechnology mean that the time has come to bring this standard-setting reference up to date. New in the Second Edition 19 completely new chapters addressing important topics in bioinstrumentation, control systems, nanotechnology, image and signal processing, electronics, environmental systems, structural systems 131 chapters fully revised and updated Expanded lists of engineering associations and societies The Engineering Handbook, Second Edition is designed to enlighten experts in areas outside their own specialties, to refresh the knowledge of mature practitioners, and to educate engineering novices. Whether you work in industry, government, or academia, this is simply the best, most useful engineering reference you can have in your personal, office, or institutional library.

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respond effectively to the questions that employers typically ask at a job interview Petrogav International has prepared this eBooks that will help you to get a job in oil and gas industry. Since these questions are so common, hiring managers will expect you to be able to answer them smoothly and without hesitation. This eBook contains 273 questions and answers for job interview and as a BONUS web addresses to 230 video movies for a better understanding of the technological process. This course covers aspects like HSE, Process, Mechanical, Electrical and Instrumentation & Control that will enable you to apply for any position in the Oil and Gas Industry.

This book and the accompanying computer software are intended to enhance and streamline the study of the field of thermodynamics. The package is design and problem-solving oriented. Released from the drain of repetitive and iterative hand calculation, students can be led to a far wider and deeper study than has been possible previously.

Comprehensively covers conventional and novel drying systems and applications, while keeping a focus on the fundamentals of drying phenomena. Presents detailed thermodynamic and heat/mass transfer analyses in a reader-friendly and easy-to-follow approach Includes case studies, illustrative examples and problems Presents experimental and computational approaches Includes comprehensive information identifying the roles of flow and heat transfer mechanisms on the drying phenomena Considers industrial applications, corresponding criterion, complications, prospects, etc. Discusses novel drying technologies, the corresponding research platforms and potential solutions Heating and Cooling of Buildings: Principles and Practice of Energy Efficient Design, Third Edition is structured to provide a rigorous and comprehensive technical foundation and coverage to all the various elements inherent in the design of energy efficient and green buildings. Along with numerous new and revised examples, design case studies, and homework problems, the third edition includes the HCB software along with its extensive website material, which contains a wealth of data to support design analysis and planning. Based around current codes and standards, the Third Edition explores the latest technologies that are central to design and operation of today's buildings. It serves as an up-to-date technical resource for future designers, practitioners, and researchers wishing to acquire a firm scientific foundation for improving the design and performance of buildings and the comfort of their occupants. For engineering and architecture students in undergraduate/graduate classes, this comprehensive textbook:

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South Africa and the Global Hydrogen Economy is the publication of a MISTRA research project on the use of strategic minerals in the global putative hydrogen economy. The book highlights the global significance of platinum group metals (PGM) and explores the strategic opportunities that arise out of South Africa's endowment of these strategic resources. From their extraction to their applications in fuel cells, what options are available for the country, the region and the world to better leverage this endowment towards supporting growth and development objectives? In view of their expanding range of applications, do PGM need the hydrogen economy? Conversely, does the hydrogen economy need PGM? Addressed to all industry stakeholders, including those in the public and private sectors, the options explored in this book are based on a thorough analysis of the global dynamics that should inform policy and business models related to PGM.

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Have you ever had a question that keeps persisting and for which you cannot find a clear answer? Is the question seemingly so 'simple that the problem is glossed over in most resources, or skipped entirely?CRC Press/Taylor and Francis is pleased to introduce Commonly Asked Questions in Thermodynamics, the first in a new series of books that address

A transition from a fossil fuel-based economy to one that uses renewable energy has become inevitable; this transition will not only be an engineering challenge, but will also be an economic and environmental one. Offering an interdisciplinary, quantitative approach, Principles of Sustainable Energy presents a comprehensive overview of the major renewable energy technologies currently available, including biomass and biofuels, solar thermal conversion, photovoltaics, and wind energy conversion. Written by renowned expert Frank Kreith, the book emphasizes economics as well as energy return on investment analyses for each technology and integrates the need for energy conservation with the overall aspects of building a sustainable energy system with renewable sources. The author covers energy storage in depth, because it is considered one of the most important, and problematic, requirements for building a sustainable renewable energy system. Treatments of the economics of nuclear power and options for transportation systems are also included. The book contains worked-out example problems illustrating engineering analyses from a systems perspective and problem sets to reinforce concepts and applications. Examples and exercises relating to solar energy systems cover latitudes in the Northern and Southern Hemispheres and use current worldwide solar radiation data. But this text is not merely academic: its clearheaded look at the energy picture from the ground up, and the environmental, economic, and sustainability benefits that renewable energy systems can provide, make it a resource for government and industry as well as a text for engineering students.

This book discusses the basic formulations of fluid mechanics and their computer modelling, as well as the relationship between experimental and analytical results. Containing papers from the Ninth International Conference on Advances in Fluid Mechanics, this book discusses the basic formulations of fluid mechanics and their computer modelling, as well as the relationship between experimental and analytical results. Scientists, engineers, and other professionals interested in the latest developments in theoretical and computational fluid mechanics will find the book a useful addition to the literature. The book covers a wide range of topics, with emphasis on new applications and research currently in progress, including: Computational Methods in Fluid Mechanics, Environmental Fluid Mechanics; Experimental Versus Simulation Methods; Multiphase Flow; Hydraulics and Hydrodynamics; Heat and Mass Transfer; Industrial Applications; Wave Studies; Biofluids; Fluid Structure Interaction.

Low-temperature technologies include the area of refrigeration and cryogenics. Since the beginning of theoretical developments and practical application, these technologies become a part of our life. Low temperatures have found application in almost all branches of industries as well as in households. These systems can be of very small capacity (few watts) up to hundreds of megawatts. In order to develop any of the technologies for successful practical application, very intensive theoretical and experimental research should be conducted. This book

provides the reader with a comprehensive overview of the latest developments, perspectives, and feasibility of new low-temperature technologies and improvements of existing systems, equipment, and evaluation methods.

Aircraft Propulsion and Gas Turbine Engines, Second Edition builds upon the success of the book's first edition, with the addition of three major topic areas: Piston Engines with integrated propeller coverage; Pump Technologies; and Rocket Propulsion. The rocket propulsion section extends the text's coverage so that both Aerospace and Aeronautical topics can be studied and compared. Numerous updates have been made to reflect the latest advances in turbine engines, fuels, and combustion. The text is now divided into three parts, the first two devoted to air breathing engines, and the third covering non-air breathing or rocket engines.

This book provides a thorough guidance on maximizing the performance of utility systems in terms of sustainability. It covers general structure, typical components and efficiency trends, and applications such as top-level analysis for steam pricing and selection of processes for improved heat integration. Examples are provided to illustrate the discussed models and methods to give sufficient learning experience for the reader.

Refrigeration Systems and Applications, 2nd edition offers a comprehensive treatise that addresses real-life technical and operational problems, enabling the reader to gain an understanding of the fundamental principles and the practical applications of refrigeration technology. New and unique analysis techniques (including exergy as a potential tool), models, correlations, procedures and applications are covered, and recent developments in the field are included - many of which are taken from the author's own research activities in this area. The book also includes some discussion of global warming issues and its potential solutions. Enables the reader to gain an understanding of the fundamental principles and the practical applications of refrigeration technologies. Discusses crucial industrial technical and operational problems, as well as new performance improvement techniques and tools for better design and analysis. Includes fundamental aspects of thermodynamics, fluid flow, and heat transfer; refrigerants; refrigeration cycles and systems; advanced refrigeration cycles and systems, including some novel applications; heat pumps; heat pipes; and many more. Provides easy to follow explanations, numerous new chapter-end problems and worked-out examples as learning aids for students and instructors. Refrigeration is extensively used in a variety of thermal engineering applications ranging from the cooling of electronic devices to food cooling processes. Its wide-ranging implications and applications mean that this industry plays a key role in national and international economies, and it continues to be an area of active research and development. Refrigeration Systems and Applications, 2nd edition forms a useful reference source for graduate and postgraduate students and researchers in academia and as well as practicing engineers working in this important field who are interested in refrigeration systems and applications and the methods and analysis tools for their analysis, design and performance improvement.

Liquid-Vapor Phase-Change Phenomena presents the basic thermophysics and transport principles that underlie the

mechanisms of condensation and vaporization processes. The text has been thoroughly updated to reflect recent innovations in research and to strengthen the fundamental focus of the first edition. Starting with an integrated presentation of the nonequilibrium thermodynamics and interfacial phenomena associated with vaporization and condensation, coverage follows of the heat transfer and fluid flow mechanisms in such processes. The second edition includes significant new material on the nanoscale and microscale thermophysics of boiling and condensation phenomena and the use of advanced computational tools to create new models of phase-change events. The importance of basic phenomena to a wide variety of applications is emphasized and illustrated throughout using examples and problems. Suitable for senior undergraduate and first-year graduate students in mechanical or chemical engineering, the book can also be a helpful reference for practicing engineers or scientists studying the fundamental physics of nucleation, boiling and condensation.

Thermodynamics being one of the basic subjects in all engineering disciplines there are umpteen books on it. The main aim of this one is to make the subject effortless for the students and help them pass the examination with flying colours. For this reason, the text has been kept short and simple and the book provides a heavy dose of solved examples, MCQs, review questions and numerical problems to hone the problem-solving skills. It has been written in such a style that the students of all streams, be it mechanical, chemical, electrical or civil, will find it comprehensible. The book covers the syllabuses of degree classes of most Indian universities. It is designed to serve both levels—the basic as well as applied thermodynamics—to give a new dimension to the learning of thermodynamics. Key Features • More than 225 Solved Examples • More than 240 MCQs • More than 210 Review Questions • More than 210 Numerical Problems

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