

Engineering Thermodynamics R K Rajput

This book presents a comprehensive treatment of the essential fundamentals of the topics that should be taught as the first-level course in Heat Transfer to the students of engineering disciplines. The book is designed to stimulate student learning through clear, concise language. The theoretical content is well balanced with the problem-solving methodology necessary for developing an orderly approach to solving a variety of engineering problems. The book provides adequate mathematical rigour to help students achieve a sound understanding of the physical processes involved. Key Features : A well-balanced coverage between analytical treatments, physical concepts and practical demonstrations. Analytical descriptions of theories pertaining to different modes of heat transfer by the application of conservation equations to control volume and also by the application of conservation equations in differential form like continuity equation, Navier–Stokes equations and energy equation. A short description of convective heat transfer based on physical understanding and practical applications without going into mathematical analyses (Chapter 5). A comprehensive description of the principles of convective heat transfer based on mathematical foundation of fluid mechanics with generalized analytical treatments (Chapters 6, 7 and 8). A separate chapter describing the basic mechanisms and principles of mass transfer showing the development of mathematical formulations and finding the solution of simple mass transfer problems. A summary at the end of each chapter to highlight key terminologies and concepts and important formulae developed in that chapter. A number of worked-out examples throughout the text, review questions, and exercise problems (with answers) at the end of each chapter. This book is appropriate for a one-semester course in Heat Transfer for undergraduate engineering students pursuing careers in mechanical, metallurgical, aerospace and chemical disciplines.

The entire book has been thoroughly revised by adding adequate text and a large number of typical examples selected from various universities and competitive examinations question papers. Besides this, Laboratory Experiments have also been added at the end of the book to make it still more a comprehensive and complete unit in all respects.

The book has been thoroughly revised. Several new articles have been added, specifically, in chapters in mortar, Concrete, Paint: Varnishes, Distempers and Antitermite treatment to make the book to still more comprehensive and a useful unit for the students preparing for the examination in the subject.

Over the past few decades there has been a prolific increase in research and development in area of heat transfer, heat exchangers and their associated technologies. This book is a collection of current research in the above mentioned areas and discusses experimental, theoretical and calculation approaches and industrial utilizations with modern ideas and methods to study heat transfer for single and multiphase systems. The topics considered include various basic concepts of heat transfer, the fundamental modes of heat transfer (namely conduction, convection and radiation), thermophysical properties, condensation, boiling, freezing, innovative experiments, measurement analysis, theoretical models and simulations, with many real-world problems and important modern applications. The book is divided in four sections : "Heat Transfer in Micro Systems", "Boiling, Freezing and Condensation Heat Transfer", "Heat Transfer and its Assessment", "Heat Transfer Calculations", and each section discusses a wide variety of techniques, methods and applications in accordance with the subjects. The combination of theoretical and experimental investigations with many important practical applications of current interest will make this book of interest to researchers, scientists, engineers and graduate students, who make use of experimental and theoretical investigations, assessment and enhancement techniques in this multidisciplinary field as well as to researchers in mathematical modelling, computer simulations and information sciences, who make use of experimental and theoretical investigations as a means of critical assessment of models and results derived from advanced numerical simulations and improvement of the developed models and numerical methods.

A Textbook of Engineering Thermodynamics Firewall Media Engineering Thermodynamics A Computer Approach (SI Units Version) Jones & Bartlett Learning

This Book Presents A Systematic Account Of The Concepts And Principles Of Engineering Thermodynamics And The Concepts And Practices Of Thermal Engineering. The Book Covers Basic Course Of Engineering Thermodynamics And Also Deals With The Advanced Course Of Thermal Engineering. This Book Will Meet The Requirements Of The Undergraduate Students Of Engineering And Technology Undertaking The Compulsory Course Of Engineering Thermodynamics. The Subject Matter Of Book Is Sufficient For The Students Of Mechanical Engineering/Industrial-Production Engineering, Aeronautical Engineering, Undertaking Advanced Courses In The Name Of Thermal Engineering/Heat Engineering/ Applied Thermodynamics Etc. Presentation Of The Subject Matter Has Been Made In Very Simple And Understandable Language. The Book Is Written In SI System Of Units And Each Chapter Has Been Provided With Sufficient Number Of Typical Numerical Problems Of Solved And Unsolved Questions With Answers.

Designed for use in a standard two-semester engineering thermodynamics course sequence. The first half of the text contains material suitable for a basic Thermodynamics course taken by engineers from all majors. The second half of the text is suitable for an Applied Thermodynamics course in mechanical engineering programs. The text has numerous features that are unique among engineering textbooks, including historical vignettes, critical thinking boxes, and case studies. All are designed to bring real engineering applications into a subject that can be somewhat abstract and mathematical. Over 200 worked examples and more than 1,300 end of chapter problems provide the use opportunities to practice solving problems related to concepts in the text. Provides the reader with clear presentations of the fundamental principles of basic and applied engineering thermodynamics. Helps students develop engineering problem solving skills through the use of structured problem-solving techniques. Introduces the Second Law of Thermodynamics through a basic entropy concept, providing students a more intuitive understanding of this key course topic. Covers Property Values before the First Law of Thermodynamics to ensure students have a firm understanding of property data before using them.

Over 200 worked examples and more than 1,300 end of chapter problems offer students extensive opportunity to practice solving problems. Historical Vignettes, Critical Thinking boxes and Case Studies throughout the book help relate abstract concepts to actual engineering applications. For greater instructor flexibility at exam time, thermodynamic tables are provided in a separate accompanying booklet. Available online testing and assessment component helps students assess their knowledge of the topics. Email textbooks@elsevier.com for details.

Intended as a textbook for “applied” or engineering thermodynamics, or as a reference for practicing engineers, the book uses extensive in-text, solved examples and computer simulations to cover the basic properties of thermodynamics. Pure substances, the first and second laws, gases, psychrometrics, the vapor, gas and refrigeration cycles, heat transfer, compressible flow, chemical reactions, fuels, and more are presented in detail and enhanced with practical applications. This version presents the material using SI Units and has ample material on SI conversion, steam tables, and a Mollier diagram. A CD-ROM, included with the print version of the text, includes a fully functional version of QuickField (widely used in industry), as well as numerous demonstrations and simulations with MATLAB, and other third party software.

Continuing the tradition of the best selling textbooks, this first edition “Engineering Thermodynamics” is a comprehensive reference to the broad spectrum of thermodynamics, encapsulating

the theoretical and practical aspects of the field. The author addresses a myriad of topics, covering both traditional and innovative approaches. Additionally, the book includes numerous tables. Designed for the course in thermodynamics or for use as a reference for practicing engineers, this book includes the theoretical underpinnings and derivations necessary for advanced study. The book focuses on the mechanical and power engineering applications of thermodynamics. Mathematics is utilized as required, serving as a tool to formulate the concepts, solve problems and applications. Furthermore, numerous examples are provided to demonstrate the applications of thermodynamics for engineering problems and to enhance the use of concepts. It also includes statistical thermodynamic examples when relevant and pertinent. These examples are shown either conceptually or numerically. Features: +Numerous examples are provided to demonstrate the applications of thermodynamics for engineering problems +Includes a comprehensive and generalist view of thermodynamics, along with historical developments in the field +Presents mathematical tools such as the Legendre transformation, the Euler chain rule, the Jacobian methodology and applications for thermodynamic derivatives.

Revised extensively and updated with several new topics, this book discusses the principles and applications of "Heat and Mass Transfer". It is written with extensive pedagogy, clear explanations and examples throughout to elucidate the concepts and facilitate problem solving.

Based on the authors' graduate courses at MIT, this text and reference provides a unified understanding of both the critical concepts of chemical thermodynamics and their applications. Part I of this book provides the theoretical basis of classical thermodynamics, including the 1st and 2nd laws, the Fundamental Equation, Legendre transformations, and general equilibrium criteria. Part II contains an extensive description of how thermodynamic properties are correlated, modeled, manipulated and estimated. Both macroscopic, empirically-based and molecular-level approaches are discussed in-depth, for pure components and mixtures. New, detailed coverage shows how traditional macroscopic models are connected to their roots at the molecular level. Part III presents applications of classical thermodynamics in detail. The book connects theory with applications at every opportunity, using extensive examples, classroom problems and homework exercises. Chemical engineering and physical chemistry graduate courses in thermodynamics.

The entire book has been thoroughly revised and a large number of solved examples under heading Additional/Typical Worked Examples (Questions selected from various Universities and Competitive Examinations) have been added at the end of the book.

This treatise on Engineering Materials and Metallurgy contains comprehensive treatment of the matter in simple, lucid and direct language and envelopes a large number of figures which reinforce the text in the most efficient and effective way. The book comprises five chapters (excluding basic concepts) in all and fully and exhaustively covers the syllabus in the above mentioned subject of 4th Semester Mechanical, Production, Automobile Engineering and 2nd semester Mechanical disciplines of Anna University.

This book provides an in-depth discussion of the principles of thermodynamics. It focuses on engineering applications of theory and sound techniques for solving thermodynamic problems. The book presents the fundamental concepts of thermodynamics and describes the theory of work and heat. The text covers in detail the first law and the second law of thermodynamics with their applications. It also explains the concepts of entropy and availability and irreversibility. In addition, the book presents thermodynamic properties of pure substances, ideal gases and mixtures of ideal gases, as well as real gases. This book is designed for undergraduate students of mechanical engineering, industrial and production engineering, automobile engineering and aeronautical engineering for their courses in thermodynamics.

"A Textbook of Heat and Mass Transfer" is a comprehensive textbook for the students of Mechanical Engineering and a must-buy for the aspirants of different entrance examinations including GATE and UPSC. Divided into 4 parts, the book delves into the subject beginning from Basic Concepts and goes on to discuss Heat Transfer (by Convection and Radiation) and Mass Transfer. The book also becomes useful as a question bank for students as it offers university as well as entrance exam questions with solutions.

Due to the rapid advances in computer technology, intelligent computer software and multimedia have become essential parts of engineering education. Software integration with various media such as graphics, sound, video and animation is providing efficient tools for teaching and learning. A modern textbook should contain both the basic theory and principles, along with an updated pedagogy. Often traditional engineering thermodynamics courses are devoted only to analysis, with the expectation that students will be introduced later to relevant design considerations and concepts. Cycle analysis is logically and traditionally the focus of applied thermodynamics. Type and quantity are constrained, however, by the computational efforts required. The ability for students to approach realistic complexity is limited. Even analyses based upon grossly simplified cycle models can be computationally taxing, with limited educational benefits. Computerised look-up tables reduce computational labour somewhat, but modelling cycles with many interactive loops can lie well outside the limits of student and faculty time budgets. The need for more design content in thermodynamics books is well documented by industry and educational oversight bodies such as ABET (Accreditation Board for Engineering and Technology). Today, thermodynamic systems and cycles are fertile ground for engineering design. For example, niches exist for innovative power generation systems due to deregulation, co-generation, unstable fuel costs and concern for global warming. Professor Kenneth Forbus of the computer science and education department at Northwestern University has developed ideal intelligent computer software for thermodynamic students called CyclePad. CyclePad is a cognitive engineering software. It creates a virtual laboratory where students can efficiently learn the concepts of thermodynamics, and allows systems to be analyzed and designed in a simulated, interactive computer aided design environment. The software guides students through a design process and is able to provide explanations for results and to coach students in improving designs. Like a professor or senior engineer, CyclePad knows the laws of thermodynamics and how to apply them. If the user makes an error in design, the program is able to remind the user of essential principles or design steps that may have been overlooked. If more help is needed, the program can provide a documented, case study that recounts how engineers have resolved similar problems in real life situations. CyclePad eliminates the tedium of learning to apply thermodynamics, and relates what the user sees on the computer screen to the design of actual systems. This integrated, engineering textbook is the result of

fourteen semesters of CyclePad usage and evaluation of a course designed to exploit the power of the software, and to chart a path that truly integrates the computer with education. The primary aim is to give students a thorough grounding in both the theory and practice of thermodynamics. The coverage is compact without sacrificing necessary theoretical rigor. Emphasis throughout is on the applications of the theory to actual processes and power cycles. This book will help educators in their effort to enhance education through the effective use of intelligent computer software and computer assisted course work.

Engineering Thermodynamics has been designed for students of all branches of engineering specially undergraduate students of Mechanical Engineering. The book will also serve as reference manual for practising engineers. The book has been written in simple language and systematically develops the concepts and principles essential for understanding the subject. The text has been supplemented with solved numerical problems, illustrations and question banks. The present book has been divided in five parts: "Thermodynamic Laws and Relations" "Properties of Gases and Vapours" "Thermodynamics Cycles" "Heat Transfer and Heat Exchangers" "Annexures

A brand new book, FUNDAMENTALS OF CHEMICAL ENGINEERING THERMODYNAMICS makes the abstract subject of chemical engineering thermodynamics more accessible to undergraduate students. The subject is presented through a problem-solving inductive (from specific to general) learning approach, written in a conversational and approachable manner. Suitable for either a one-semester course or two-semester sequence in the subject, this book covers thermodynamics in a complete and mathematically rigorous manner, with an emphasis on solving practical engineering problems. The approach taken stresses problem-solving, and draws from best practice engineering teaching strategies. FUNDAMENTALS OF CHEMICAL ENGINEERING THERMODYNAMICS uses examples to frame the importance of the material. Each topic begins with a motivational example that is investigated in context to that topic. This framing of the material is helpful to all readers, particularly to global learners who require big picture insights, and hands-on learners who struggle with abstractions. Each worked example is fully annotated with sketches and comments on the thought process behind the solved problems. Common errors are presented and explained. Extensive margin notes add to the book accessibility as well as presenting opportunities for investigation. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

The Clear, Well-Organized Introduction to Thermodynamics Theory and Calculations for All Chemical Engineering Undergraduate Students This text is designed to make thermodynamics far easier for undergraduate chemical engineering students to learn, and to help them perform thermodynamic calculations with confidence. Drawing on his award-winning courses at Penn State, Dr. Themis Matsoukas focuses on "why" as well as "how." He offers extensive imagery to help students conceptualize the equations, illuminating thermodynamics with more than 100 figures, as well as 190 examples from within and beyond chemical engineering. Part I clearly introduces the laws of thermodynamics with applications to pure fluids. Part II extends thermodynamics to mixtures, emphasizing phase and chemical equilibrium. Throughout, Matsoukas focuses on topics that link tightly to other key areas of undergraduate chemical engineering, including separations, reactions, and capstone design. More than 300 end-of-chapter problems range from basic calculations to realistic environmental applications; these can be solved with any leading mathematical software. Coverage includes • Pure fluids, PVT behavior, and basic calculations of enthalpy and entropy • Fundamental relationships and the calculation of properties from equations of state • Thermodynamic analysis of chemical processes • Phase diagrams of binary and simple ternary systems • Thermodynamics of mixtures using equations of state • Ideal and nonideal solutions • Partial miscibility, solubility of gases and solids, osmotic processes • Reaction equilibrium with applications to single and multiphase reactions

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.

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