An Introduction To Combustion Concepts And Applications 3rd Edition Solution Manual

CombustionProperties Tables Booklet for Thermal Fluids EngineeringCombustion Engineering, Second EditionAn Introduction to CombustionDust Explosion DynamicsReinforced and Prestressed ConcreteUnsteady Combustor PhysicsModeling of Combustion SystemsIntroduction to Physics and Chemistry of CombustionIntroduction to Catalytic CombustionAn Introduction to Combustion?Combustion Science and EngineeringAn introduction to combustionCombustion EmissionsCombustionApplied CombustionIntroduction to Internal Combustion EnginesFundamentals of Fire PhenomenaAn Introduction of Combustion Concepts and ApplicationsEngine Emission Control TechnologiesThermodynamicsPrinciples of CombustionThermodynamicsFundamentals of Combustion EngineeringExperimental CombustionSolutions Manual to Accompany an Introduction to CombustionCombustion and Pollution Control in Heating SystemsInternal Combustion Engine FundamentalsFlashback Mechanisms in Lean Premixed Gas Turbine CombustionSoftware to Accompany An Introduction to Combustion Concepts and Applications by Stephen R. TurnsMicrogravity CombustionAn Introduction to Combustion: Concepts and ApplicationsLoose Leaf for An Introduction to Combustion: Concepts and ApplicationsCombustion and Mass TransferSolutions Manual to Accompany an Introduction to CombustionFundamentals of Premixed Turbulent CombustionSoftware to Accompany An Introduction to CombustionCombustion Processes in PropulsionIntroduction to Combustion PhenomenaFundamentals of Combustion Processes

Combustion

Properties Tables Booklet for Thermal Fluids Engineering

Combustion Engineering, Second Edition

This text presents the theoretical and practical aspects of analysis and design, complemented by numerous design examples.

An Introduction to Combustion

This text, by a leading authority in the field, presents a fundamental and factual development of the science and

engineering underlying the design of combustion engines and turbines. An extensive illustration program supports the concepts and theories discussed.

Dust Explosion Dynamics

Throughout its previous four editions, Combustion has made a very complex subject both enjoyable and understandable to its student readers and a pleasure for instructors to teach. With its clearly articulated physical and chemical processes of flame combustion and smooth, logical transitions to engineering applications, this new edition continues that tradition. Greatly expanded end-of-chapter problem sets and new areas of combustion engineering applications make it even easier for students to grasp the significance of combustion to a wide range of engineering practice, from transportation to energy generation to environmental impacts. Combustion engineering is the study of rapid energy and mass transfer usually through the common physical phenomena of flame oxidation. It covers the physics and chemistry of this process and the engineering applications—including power generation in internal combustion automobile engines and gas turbine engines. Renewed concerns about energy efficiency and fuel costs, along with continued concerns over toxic and particulate emissions, make this a crucial area of engineering. New chapter on new combustion concepts and technologies, including discussion on nanotechnology as related to combustion, as well as microgravity combustion, microcombustion, and catalytic combustion—all interrelated and discussed by considering scaling issues (e.g., length and time scales) New information on sensitivity analysis of reaction mechanisms and generation and application of reduced mechanisms Expanded coverage of turbulent reactive flows to better illustrate real-world applications Important new sections on stabilization of diffusion flames—for the first time, the concept of triple flames will be introduced and discussed in the context of diffusion flame stabilization

Reinforced and Prestressed Concrete

Presents an updated, full-color, second edition on thermodynamics, providing a structured approach to this subject and a wealth of new problems.

Unsteady Combustor Physics

Combustion Emissions: Formation, Reaction, and Removal of Trace Metals in Combustion Products presents the latest scientific knowledge on combustion, with a particular focus on the behavior of elements in this high temperature method of energy generation. The book describes methods of control and establishes a solid base of understanding for future research. Encyclopedic in style and consistent in format, each chapter systematically presents a complete analysis of the

combustion behavior of each element and guides the reader in resolving specific problems. This includes source levels in fuels and fuel usage, emission and pollutant release into the environment and environmental effects, and more. Societal impacts and environmental concerns are considered throughout, highlighting sustainability aspects across a diverse range of applications, such as within power plants, automobiles and propulsion. Presents the latest research in a very systematic way Includes methods of control and establishes a base of understanding for future research in energy systems Analyzes the individual behavior of 34 elements, considering their chemistry, nature and environmental impacts

Modeling of Combustion Systems

Dust Explosion Dynamics focuses on the combustion science that governs the behavior of the three primary hazards of combustible dust: dust explosions, flash fires, and smoldering. It explores the use of fundamental principles to evaluate the magnitude of combustible dust hazards in a variety of settings. Models are developed to describe dust combustion phenomena using the principles of thermodynamics, transport phenomena, and chemical kinetics. Simple, tractable models are described first and compared with experimental data, followed by more sophisticated models to help with future challenges. Dr. Ogle introduces the reader to just enough combustion science so that they may read, interpret, and use the scientific literature published on combustible dusts. This introductory text is intended to be a practical guide to the application of combustible dust models, suitable for both students and experienced engineers. It will help you to describe the dynamics of explosions and fires involving dust and evaluate their consequences which in turn will help you prevent damage to property, injury and loss of life from combustible dust accidents. Demonstrates how the fundamental principles of combustion science can be applied to understand the ignition, propagation, and extinction of dust explosions Explores fundamental concepts through model-building and comparisons with empirical data Provides detailed examples to give a thorough insight into the hazards of combustible dust as well as an introduction to relevant scientific literature

Introduction to Physics and Chemistry of Combustion

Introduction to Catalytic Combustion

Lean burning of premixed gases is considered to be a promising combustion technology for future clean and highly efficient gas turbine combustors. Yet researchers face several challenges in dealing with premixed turbulent combustion, from its nonlinear multiscale nature and the impact of local phenomena to the multitude of competing models. Filling

An Introduction to Combustion?

This booklet is an ideal supplement for any course in thermodynamics or the thermal fluid sciences and a handy reference for the practising engineer. The tables in the booklet complement and extend the property tables in the appendices to Stephen Turn's Thermodynamics: Concepts and Applications and Thermal-Fluid Sciences: An Integrated Approach. In addition to duplicating the SI tables in these books it extends the tables to cover US customary units as well. The booklet also contains property data for the refrigerant R-134a and properties of the atmosphere at high altitudes.

Combustion Science and Engineering

Chemical propulsion comprises the science and technology of using chemical reactions of any kind to create thrust and thereby propel a vehicle or object to a desired acceleration and speed. This book focuses on recent advances in the design of very highly efficient, low-pollution-emitting propulsion systems, as well as advances in testing, diagnostics and analysis. It offers unique coverage of Pulse Detonation Engines, which add tremendous power to jet thrust by combining high pressure with ignition of the air/fuel mixture. Readers will learn about the advances in the reduction of jet noise and toxic fuel emissions-something that is being heavily regulated by relevant government agencies. * Lead editor is one of the world's foremost combustion researchers, with contributions from some of the world's leading researchers in combustion engineering * Covers all major areas of chemical propulsion-from combustion measurement, analysis and simulation, to advanced control of combustion processes, to noise and emission control * Includes important information on advanced technologies for reducing jet engine noise and hazardous fuel combustion emissions

An introduction to combustion

Fulfilling the need for a classical approach, Experimental Combustion: An Introduction begins with an overview of the key aspects of combustion-including chemical kinetics, premixed flame, diffusion flame, and liquid droplet combustion-followed by a discussion of the general elements of measurement systems and data acquisition and analysis. In addi

Combustion Emissions

The focus of Thermodynamics: Concepts and Applications is on traditional thermodynamics topics, but structurally the book introduces the thermal-fluid sciences. Chapter 2 includes essentially all material related to thermodynamic properties clearly showing the hierarchy of thermodynamic state relationships. Element conservation is considered in Chapter 3 as a way of expressing conservation of mass. Constant-pressure and volume combustion are considered in Chapter 5 - Energy Conservation. Chemical and phase equilibria are treated as a consequence of the 2nd law in Chapter 6. 2nd law topics are introduced hierarchically in one chapter, important structure for a beginner. The book is designed for the instructor to select

topics and combine them with material from other chapters seamlessly. Pedagogical devices include: learning objectives, chapter overviews and summaries, historical perspectives, and numerous examples, questions and problems and lavish illustrations. Students are encouraged to use the National Institute of Science and Technology (NIST) online properties database.

Combustion

Blending fuels with hydrogen offers the potential to reduce NOx and CO2 emissions in gas turbines, but doing so introduces potential new problems such as flashback. Flashback can lead to thermal overload and destruction of hardware in the turbine engine, with potentially expensive consequences. The little research on flashback that is available is fragmented. Flashback Mechanisms in Lean Premixed Gas Turbine Combustion by Ali Cemal Benim will address not only the overall issue of the flashback phenomenon, but also the issue of fragmented and incomplete research. Presents a coherent review of flame flashback (a classic problem in premixed combustion) and its connection with the growing trend of popularity of more-efficient hydrogen-blend fuels Begins with a brief review of industrial gas turbine combustion technology Covers current environmental and economic motivations for replacing natural gas with hydrogen-blend fuels

Applied Combustion

Students embarking on their studies in chemical, mechanical, aerospace, energy, and environmental engineering will face continually changing combustion problems, such as pollution control and energy efficiency, throughout their careers. Approaching these challenges requires a deep familiarity with the fundamental theory, mathematics, and physical concepts of combustion. Based on more than two decades of teaching experience, Combustion Science and Engineering lays the necessary groundwork while using an illustrative, hands-on approach. Taking a down-to-earth perspective, the book avoids heavy mathematics in the first seven chapters and in Chapter 17 (pollutants formation and destruction), but considers molecular concepts and delves into engineering details. It begins with an outline of thermodynamics; basics of thermochemistry and chemical equilibrium; descriptions of solid, liquid, and gaseous fuels; chemical kinetics and mass transfer; and applications of theory to practical systems. Beginning in chapter 8, the authors provide a detailed treatment of differential forms of conservation equations; analyses of fuel combustion including jet combustion and boundary layer problems; ignition; flame propagation; interactive and group combustion; pollutant formation and control; and turbulent combustion. In addition, this textbook includes abundant examples, illustrations, and exercises, as well as spreadsheet software in combustion available for download. This software allows students to work out the examples found in the text. Combustion Science and Engineering imparts the skills and foundational knowledge necessary for students to successfully approach and solve new problems.

Introduction to Internal Combustion Engines

In a clear and concise manner, this book explains how to apply concepts in chemical reaction engineering and transport phenomena to the design of catalytic combustion systems. Although there are many textbooks on the subject of chemical reaction engineering, catalytic combustion is mentioned either only briefly or not at all. The authors have chosen three examples where catalytic combustion is utilized as a primary combustion process and natural gas is used as a fuel - stationary gas turbines, process fluid heaters, and radiant heaters; these cover much of the area where research is currently most active. In each of these there are clear environmental benefits to be gained illustrating catalytic combustion as a "cleaner primary combustion process" . The dominant heat transfer processes in each of the applications are different, as are the support systems, flow geometrics and operating conditions.

Fundamentals of Fire Phenomena

An Introduction of Combustion Concepts and Applications

This comprehensive text covers principles and applications with an emphasis on the theoretical modeling of combustion. Addresses chemical thermodynamics and kinetics, conservation equations for multi-component reacting flows, deflagration and detonation waves, premixed laminar flames, spray combustion of fuel droplets, ignition, and related topics. Many examples are included to demonstrate the application of theory. Emphasizes the use of digital computers for solutions.

Engine Emission Control Technologies

Developing clean, sustainable energy systems is a pre-eminent issue of our time. Most projections indicate that combustion-based energy conversion systems will continue to be the predominant approach for the majority of our energy usage. Unsteady combustor issues present the key challenge associated with the development of clean, high-efficiency combustion systems such as those used for power generation, heating or propulsion applications. This comprehensive study is unique, treating the subject in a systematic manner. Although this book focuses on unsteady combusting flows, it places particular emphasis on the system dynamics that occur at the intersection of the combustion, fluid mechanics and acoustic disciplines. Individuals with a background in fluid mechanics and combustion will find this book to be an incomparable study that synthesises these fields into a coherent understanding of the intrinsically unsteady processes in combustors.

Thermodynamics

Principles of Combustion

This Second Edition retains all the same primary objectives as the original text: First, to present basic combustion concepts using relatively simple and easy-to -understand analyses; and second, to introduce a wide variety of practical applications which motivate or relate to the various theoretical concepts. The overarching goal is to provide a textbook which is useful for both formal undergraduate study in mechanical engineering and in related fields, and informal study by practicing engineers.

Thermodynamics

Now in its fourth edition, Introduction to Internal Combustion Engines remains the indispensable text to guide you through automotive or mechanical engineering, both at university and beyond. Thoroughly updated, clear, comprehensive and well-illustrated, with a wealth of worked examples and problems, its combination of theory and applied practice is sure to help you understand internal combustion engines, from thermodynamics and combustion to fluid mechanics and materials science. Introduction to Internal Combustion Engines: - Is ideal for students who are following specialist options in internal combustion engines, and also for students at earlier stages in their courses - especially with regard to laboratory work - Will be useful to practising engineers for an overview of the subject, or when they are working on particular aspects of internal combustion engines that are new to them - Is fully updated including new material on direct injection spark engines, supercharging and renewable fuels - Offers a wealth of worked examples and end-of-chapter questions to test your knowledge - Has a solutions manual availble online for lecturers at www.palgrave.com/engineering/stone

Fundamentals of Combustion Engineering

Increasing competitive pressure for improved quality and efficiency on one hand and tightening emissions and operating requirements on the other leave the modern process engineer squeezed in the middle. While effective modeling can help balance these demands, the current literature offers overly theoretical treatments on modeling that do not translate quickly and easily to the immediate needs of the practicing engineer. Based on more than a quarter-century of experience, Modeling of Combustion Systems: A Practical Approach introduces an approach to semi-empirical combustion modeling for better control, optimization, prediction, and description of industrial combustion processes. First, the author provides an introduction to modeling, the basic model categories, and analytical methods followed by an introduction to combustion that includes equipment and mathematical modeling. Next, he introduces the concepts and procedures of experimental design and provides detailed discussion on how to analyze non-ideal data. The final chapter draws together the previous

information to clearly demonstrate the construction of semi-empirical models. Fully worked examples and step-by-step derivations support the discussion along the way, and the book also includes a complete guide to nomenclature and supplies appendices for important physical and chemical properties, conversions, statistical tables, and much more. Modeling of Combustion Systems: A Practical Approach provides concrete answers to real problems and is tailor-made to suit the needs of practicing engineers.

Experimental Combustion

Combustion is very much an interdisciplinary topic, drawing together elements of chemistry, fluid mechanics and heat transfer. It is an ingredient in many undergraduate degree programmes, ranging from a pivotal role in fuel science through to a component part of courses in chemical, process and building services engineering. For many students in those disciplines where combustion in heating plant is an important part of their studies, there are often problems in coming to grips with the basic principles underlying the combustion of hydrocarbon fuels. In particular, the concepts of chemical and related thermodynamic changes can prove difficult to assimilate. The scientific literature dealing with combustion tends to be rather polarised, with a wealth of literature aimed at the specialist reader, but at a basic level the fundamentals of this important process are often treated rather tersely in textbooks on thermodynamics. The objective of this book is to provide an introduction to the basic principles of the combustion of hydrocarbon fuels in heating plant for buildings and industrial processes. In those chapters where practice in problem solving can make a positive contribution to understanding, some numerical problems have been included. Acknowledging the ever-widening use of computers in technical education, a number of algorithms which can be easily coded up for solving numerical problems have been incorporated in the text. These can prove particularly useful in, for example, the calculation of certain fluid properties, either for use in hand calculation or for incorporation into larger programs.

Solutions Manual to Accompany an Introduction to Combustion

Combustion and Pollution Control in Heating Systems

Internal Combustion Engine Fundamentals

This book provides an introduction to understanding combustion, the burning of a substance that produces heat and often light, in microgravity environments-i.e., environments with very low gravity such as outer space. Readers are presented

with a compilation of worldwide findings from fifteen years of research and experimental tests in various low-gravity environments, including drop towers, aircraft, and space. Microgravity Combustion is unique in that no other book reviews low- gravity combustion research in such a comprehensive manner. It provides an excellent introduction for those researching in the fields of combustion, aerospace, and fluid and thermal sciences. * An introduction to the progress made in understanding combustion in a microgravity environment * Experimental, theoretical and computational findings of current combustion research * Tutorial concepts, such as scaling analysis * Worldwide microgravity research findings

Flashback Mechanisms in Lean Premixed Gas Turbine Combustion

Software to Accompany An Introduction to Combustion Concepts and Applications by Stephen R. Turns

This book is an introductory text on fundamental aspects of combustion including thermodynamics, heat and mass transfer and chemical kinetics which are used to systematically derive the basic concepts of combustion. Apart from the fundamental aspects, many of the emerging topics in the field like microscale combustion, combustion dynamics, oxy-fuel combustion and combustion diagnostics are also covered in the book. This would help the beginners in the subject to get initiated to the state of the art topics. Key Features: Coverage of the essential aspects of combustion engineering suitable for both beginners and practicing professionals Topics like entropy generation, microscale combustion, combustion diagnostics, second law-based analysis exclusive to the title Balanced treatment of thermodynamics, transport phenomena and chemical kinetics Discussion on state of the art techniques in combustion diagnostics Illustrates combustion of gaseous, liquid and solid fuels along with emission of pollutants and greenhouse gases

Microgravity Combustion

An Introduction to Combustion: Concepts and Applications

Fundamentals of Combustion Processes is designed as a textbook for an upper-division undergraduate and graduate level combustion course in mechanical engineering. The authors focus on the fundamental theory of combustion and provide a simplified discussion of basic combustion parameters and processes such as thermodynamics, chemical kinetics, ignition, diffusion and pre-mixed flames. The text includes exploration of applications, example exercises, suggested homework problems and videos of laboratory demonstrations

Loose Leaf for An Introduction to Combustion: Concepts and Applications

Combustion Engineering, Second Edition maintains the same goal as the original: to present the fundamentals of combustion science with application to today's energy challenges. Using combustion applications to reinforce the fundamentals of combustion science, this text provides a uniquely accessible introduction to combustion for undergraduate students, first-year graduate students, and professionals in the workplace. Combustion is a critical issue impacting energy utilization, sustainability, and climate change. The challenge is to design safe and efficient combustion systems for many types of fuels in a way that protects the environment and enables sustainable lifestyles. Emphasizing the use of combustion fundamentals in the engineering and design of combustion systems, this text provides detailed coverage of gaseous, liquid and solid fuel combustion, including focused coverage of biomass combustion, which will be invaluable to new entrants to the field. Eight chapters address the fundamentals of combustion, including fuels, thermodynamics, chemical kinetics, flames, detonations, sprays, and solid fuel combustion mechanisms. Eight additional chapters apply these fundamentals to furnaces, spark ignition and diesel engines, gas turbines, and suspension burning, fixed bed combustion, and fluidized bed combustion of solid fuels. Presenting a renewed emphasis on fundamentals and updated applications to illustrate the latest trends relevant to combustion engineering, the authors provide a number of pedagogic features, including: Numerous tables with practical data and formulae that link combustion fundamentals to engineering practice Concise presentation of mathematical methods with qualitative descriptions of their use Coverage of alternative and renewable fuel topics throughout the text Extensive example problems, chapter-end problems, and references These features and the overall fundamentals-to-practice nature of this book make it an ideal resource for undergraduate, first level graduate, or professional training classes. Students and practitioners will find that it is an excellent introduction to meeting the crucial challenge of engineering sustainable combustion systems in a cost-effective manner. A solutions manual and additional teaching resources are available with qualifying course adoption.

Combustion and Mass Transfer

Introduction to Combustion is the leading combustion textbook for undergraduate and graduate students because of its easy-to-understand analyses of basic combustion concepts and its introduction of a wide variety of practical applications that motivate or relate to the various theoretical concepts. This is a text that is useful for junior/senior undergraduates or graduate students in mechanical engineering and practicing engineers. The fourth edition updates and adds topics related to the role of combustion in a sustainable energy future, and modern open-source software has been integrated throughout.

Solutions Manual to Accompany an Introduction to Combustion

Understanding fire dynamics and combustion is essential in fire safety engineering and in fire science curricula. Engineers and students involved in fire protection, safety and investigation need to know and predict how fire behaves to be able to implement adequate safety measures and hazard analyses. Fire phenomena encompass everything about the scientific principles behind fire behavior. Combining the principles of chemistry, physics, heat and mass transfer, and fluid dynamics necessary to understand the fundamentals of fire phenomena, this book integrates the subject into a clear discipline: Covers thermochemistry including mixtures and chemical reactions; Introduces combustion to the fire protection student; Discusses premixed flames and spontaneous ignition; Presents conservation laws for control volumes, including the effects of fire; Describes the theoretical bases for empirical aspects of the subject of fire; Analyses ignition of liquids and the importance of evaporation including heat and mass transfer; Features the stages of fire in compartments, and the role of scale modeling in fire. Fundamentals of Fire Phenomena is an invaluable reference tool for practising engineers in any aspect of safety or forensic analysis. Fire safety officers, safety practitioners and safety consultants will also find it an excellent resource. In addition, this is a must-have book for senior engineering students and postgraduates studying fire protection and fire aspects of combustion.

Fundamentals of Premixed Turbulent Combustion

Combustion, the process of burning, is defined as a chemical reaction between a combustible reactant (the fuel) and an oxidizing agent (such as air) in order to produce heat and in most cases light while new chemical species (e.g., flue gas components) are formed. This book covers a gap on the market by providing a concise introduction to combustion. Most of the other books currently available are targeted towards the experienced users and contain too many details and/or contain knowledge at a fairly high level. This book provides a brief and clear overview of the combustion basics, suitable for beginners and then focuses on practical aspects, rather than theory, illustrated by a number of industrial applications as examples. The content is aimed to provide a general understanding of the various concepts, techniques and equipment for students at all level as well as practitioners with little or no prior experience in the field. The authors are all international experts in the field of combustion technology and adopt here a clear didactic style with many practical examples to cover the most common solid, liquid and gaseous fuels. The associated environmental impacts are also discussed so that readers can develop an understanding of the major issues and the options available for more sustainable combustion processes. With a foreword by Katharina Kohse-Höinghaus

Software to Accompany An Introduction to Combustion

The second edition of this practical text offers a broad introduction to the engineering principles of chemical energy conversion. Eugene L. Keating, Ph.D., P.E., a recognized authority within academia, government, and industry, examines

combustion science and technology using fundamental principles. Thermochemical engineering data and design formulations of basic performance relationships appear in dual SI and English engineering dimensions and units, helping you save time and avoid conversion errors. New in the Second Edition Streamlined organization that progressively develops fundamental concepts Extended section on fuel cells New section on the nitrogen-oxygen reaction system Additional coverage of environmental aspects of specific combustion characteristics New chapter on thermal destruction Furnishing examples that demonstrate a proper engineering analysis as well as important concepts relevant to the nature of combustion devices, Applied Combustion, Second Edition explores the ideal oxidation-reaction equation, fuel heat release rates, chemical equilibrium, incomplete combustion, chemical kinetics, and detonation, thermal explosion, and basic flame theories. The book treats the features of chemical energy resources and presents a thermochemical overview of current and potential solid, liquid, and gaseous natural and synthetic fuel resources. It also describes the fuel-engine interface characteristics of important external and internal combustion heat engines in terms of fuel compatibility, consumption rates, pollution characteristics, emission controls, and energy conversion efficiencies.

Combustion Processes in Propulsion

Most of the material covered in this book deals with the fundamentals of chemistry and physics of key processes and fundamental mechanisms for various combustion and combustion related phenomena in gaseous combustible mixture. It provides the reader with basic knowledge of burning processes and mechanisms of reaction wave propagation. The combustion of a gas mixture (flame, explosion, detonation) is necessarily accompanied by motion of the gas. The process of combustion is therefore not only a chemical phenomenon but also one of gas dynamics. The material selection focuses on the gas phase and with premixed gas combustion. Premixed gas combustion is of practical importance in engines, modern gas turbine and explosions, where the fuel and air are essentially premixed, and combustion occurs by the propagation of a front separating unburned mixture from fully burned mixture. Since premixed combustion is the most fundamental and potential for practical applications, the emphasis in the present work is be placed on regimes of premixed combustion. This text is intended for graduate students of different specialties, including physics, chemistry, mechanical engineering, computer science, mathematics and astrophysics.

Introduction to Combustion Phenomena

Combustion and Mass Transfer: A Textbook with Multiple-Choice Exercises for Engineering Students is a 20-chapter lecture text that covers various aspects of combustion and mass transfer. Each of the 20 chapters is provided with a set partly analytical and multiple-choice tutorial exercises, designed to assist the student to understand the material of the lectures. The opening chapters deal with the importance of combustion and mass transfer processes. The succeeding chapters

survey the concepts and principles of droplet vaporization, droplet combustion, liquid-propellant rocket, and laminar and turbulent jet. These topics are followed by discussions of laminar and turbulent diffusion flame, kinetically-influenced phenomena, chemical kinetics, and spontaneous ignition. The remaining chapters consider the basic concepts of stirred reactor, flame stabilization, laminar flame propagation, spark ignition, and coal-particle combustion. This book is intended for undergraduate mechanical engineering students.

Fundamentals of Combustion Processes

This new volume covers the important issues related to environmental emissions from SI and CI engines as well as their formation and various pollution mitigation techniques. The book addresses aspects of improvements in engine modification, such as design modifications for enhanced performance, both with conventional fuels as well as with new and alternative fuels. It also explores some new combustion concepts that will help to pave the way for complying with new emission concepts. Alternative fuels are addressed in this volume to help mitigate harmful emissions, and alternative power sources for automobiles are also discussed briefly to cover the switch over from fueled engines to electrics, including battery-powered electric vehicles and fuel cells. The authors explain the different technologies available to date to overcome the limitations of conventional prime movers (fueled by both fossil fuels and alternative fuels). Topics examined include: • Engine modifications needed to limit harmful emissions • The use of engine after-treatment devices to contain emissions • The development of new combustion concepts • Adoption of alternative fuels in existing engines • Switching over to electrics—advantages and limitations • Specifications of highly marketed automobiles • Emission measurement methods