

Power Plant Engineering Vijayaragavan

The globally escalating population necessitates production of more goods and services to fulfil the expanding demands of human beings which resulted in urbanization and industrialization. Uncontrolled industrialization caused two major problems – energy crisis and accelerated environmental pollution throughout the world. Presently, there are technologies which have been proposed or shown to tackle both the problems. Researchers continue to seek more cost effective and environmentally beneficial pathways for problem solving. Plant kingdom comprises of species which have the potential to resolve the couple problem of pollution and energy. Plants are considered as a potential feedstock for development of renewable energy through biofuels. Another important aspect of plants is their capacity to sequester carbon dioxide and absorb, degrade, and stabilize environmental pollutants such as heavy metals, poly-aromatic hydrocarbons, poly-aromatic biphenyls, radioactive materials, and other chemicals. Thus, plants may be used to provide renewable energy generation and pollution mitigation. An approach that could amalgamate the two aspects can be achieved through phytoremediation (using plants to clean up polluted soil and water), and subsequent generation of energy from the phyto-remediator plants. This would be a major advance in achieving sustainability that focuses on optimizing ‘people’ (social issues), ‘planet’ (environmental issues), and ‘profit’ (financial issues). The “Phytoremediation-Cellulosic Biofuels” (PCB) process will be socially beneficial through reducing pollution impacts on people, ecologically beneficial through pollution abatement, and economically viable through providing revenue that supplies an energy source that is renewable and also provides less dependence on importing foreign energy (energy-independence). The utilization of green plants for pollution remediation and energy production will also tackle some other important global concerns like global climate change, ocean acidification, and land degradation through carbon sequestration, reduced emissions of other greenhouse gases, restoration of degraded lands and waters, and more. This book addresses the overall potential of major plants that have the potential to fulfil the dual purposes of phytoremediation and energy generation. The non-edible bioenergy plants that are explored for this dual objective include *Jatropha curcas*, *Ricinus communis*, *Leucaena leucocephala*, *Milletia pinnata*, *Canabis sativa*, *Azadirachta indica*, and *Acacia nilotica*. The book addresses all possible aspects of phyto-remediation and energy generation in a holistic way. The contributors are one of most authoritative experts in the field and have covered and compiled the best content most comprehensively. The book is going to be extremely useful for researchers in the area, research students, academicians and also for policy makers for an inclusive understanding and assessment of potential in plant kingdom to solve the dual problem of energy and pollution.

Special Features: This textbook is useful for the undergraduate students embarking introductory course in Mechatronics and Microprocessors and covers the revised syllabus prescribed by Visvesvaraya Technological University (VTU), Karnataka, India with effect from 2008 for third year Mechanical, Mechatronics and Automobile Engineering students. 1. Updated coverage on microprocessors and programming as represented by the Syllabus Map. 2. Working and applications provided for various components. 3. Wide variety of solved problems with step-by-step solutions. 4. Concepts well illustrated by labeled circuit diagrams. 5. Related examples and microprocessors programs. 6. Excellent pedagogy that includes: 360+ illustrations and line diagrams. 60+ solved examples. 260+ review questions. 160+ objective-type questions. 30+ chapter-end problems. 50+ explanatory examples. Model question papers. **About The Book:** This textbook is useful for the undergraduate students embarking on an introductory course in Mechatronics and Microprocessors. The text focuses and is written for engineering students, and for those who would like to understand the principles of mechatronic systems and microprocessors. However, it is designed to meet with the requirements for mechanical, manufacturing and automobile engineering programmes prescribed by the Visvesvaraya Technological University (VTU), Karnataka, in India. It covers the revised syllabus prescribed by VTU Karnataka, with effect from 2008 for third year Mechanical, Mechatronics and Automobile Engineering students. Updated coverage on microprocessors and programming as represented by the Syllabus Map. Working and applications provided for various components. Wide variety of solved problems with step-by-step solutions. Concepts well illustrated by labeled circuit diagrams. Related examples and microprocessors programs. Excellent pedagogy that includes: 360+ illustrations and line diagrams. 60+ solved examples. 260+ review questions. 160+ objective-type questions. 30+ chapter-end problems. 50+ explanatory examples. Model question papers.

The book proposes new technologies and discusses future solutions for ICT design infrastructures, and includes high-quality submissions presented at the Third International Conference on ICT for Sustainable Development (ICT4SD 2018), held in Goa, India on 30–31 August 2018. The conference stimulated cutting-edge research discussions among pioneering researchers, scientists, industrial engineers, and students from all around the world. Bringing together experts from different countries, the book focuses on innovative issues at an international level.

Mechatronics has emerged as its own discipline over the past decade, yet no reference has lived up to the demands of being a working guide for designing and implementing the new generation of mechatronic systems. Uniting an international team of leading experts, *Mechatronic Systems: Devices, Design, Control, Operation and Monitoring* rises to the ch

The book is a collection of high-quality peer-reviewed research papers presented at International Conference on Information System Design and Intelligent Applications (INDIA 2017) held at Duy Tan University, Da Nang, Vietnam during 15-17 June 2017. The book covers a wide range of topics of computer science and information technology discipline ranging from image processing, database application, data mining, grid and cloud computing, bioinformatics and many others. The various intelligent tools like swarm

intelligence, artificial intelligence, evolutionary algorithms, bio-inspired algorithms have been well applied in different domains for solving various challenging problems.

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.

Engineering Chemistry-II serves as a textbook for the second semester course for 1 year BE/B. Tech students of Anna University, Chennai. The book is informative and exhaustive to meet the requirements of students who aim to assimilate authentic knowledge for use during engineering course as well as in their careers. The theoretical portions have been explained in simple language, clear style with lot of solved problems and illustrated diagrams. Academic and industrial communities will find this book a valuable resource. Key Features • Specifically designed for 1 year B.E. students of colleges affiliated to Anna University, Chennai. • The chapters are presented in simple language. • Suitable diagrams for clear understanding of the concepts. • The recent developments in the respective fields are included in all the chapters. • Comparative tables are presented where ever two similar concepts arise. • Many solved problems. • Review questions from previous Anna University examinations at the end of each chapter.

Undernourishment in some areas and abundance in others, accelerated climate changes, food distribution and security challenges, fluctuating economic and political stability and oversaturation in information - this is the world we are living in today. It seems that there is no time for the basic science plant research; instead of years of dedicated investigation, scientists are forced to wrap up their know-how in a project-oriented deliverables as fast as possible. The main strength of this book is the new knowledge about plant engineering that could be transferred into the applied science and, later on, to the industry.

However, we should not forget that all great discoveries begin with the fundamental research, the wealth of good ideas and the dedicated scientific work.

Numerical examples for each of the equations derived Solved problems to highlight whole spectrum of applications Objective questions for self evaluation Graded problems for exercises, mostly with answers Up-to-date documentation on the current scope of the research of Rapid Prototyping, Tooling and Manufacturing. Explains and details the latest techniques and materials used for RP, RT and RM. Develops methodologies and technologies to support in a customer-focused product design and mass customization approach to production.

This book presents a complete and accessible description of the history of early India. It starts by discussing the origins and growth of civilizations, empires, and religions. It also deals with the geographical, ecological, and linguistic backgrounds, and looks at specific cultures of the Neolithic, Chalcolithic, and Vedic periods, as well as at the Harappan civilization. In addition, the rise of Jainism and Buddhism, Magadha and the beginning of territorial states, and the period of Mauryas, Central Asian countries, Satvahanas, Guptas, and Harshavardhana are also analysed. Next, it stresses varna system, urbanization, commerce and trade, developments in science and philosophy, and cultural legacy. Finally, the process of transition from ancient to medieval India and the origin of the Aryan culture has also been examined.

Engineering Metrology and Measurements is a textbook designed for students of mechanical, production and allied disciplines to facilitate learning of various shop-floor measurement techniques and also understand the basics of mechanical measurements.

This book serves as an introduction to targeted genome editing, beginning with the background of this rapidly developing field and methods for generation of engineered nucleases.

Applications of genome editing tools are then described in detail, in iPS cells and diverse organisms such as mice, rats, marine invertebrates, fish, frogs, and plants. Tools that are mentioned include zinc finger nucleases (ZFNs), transcription activator-like effector nucleases (TALENs), and CRISPR/Cas9, all of which have received much attention in recent years as breakthrough technologies. Genome editing with engineered nucleases allows us to precisely change the target genome of living cells and is a powerful way to control functional genes. It is feasible in almost all organisms ranging from bacteria to plants and animals, as well as in cultured cells such as ES and iPS cells. Various genome modifications have proven successful, including gene knockout and knock-in experiments with targeting vectors and chromosomal editing. Genome editing technologies hold great promise for the future, for example in biomedical research, clinical medicine, and generation of crops and livestock with desirable traits. A wide range of readers will find this book interesting, and with its focus on applications in a variety of organisms and cells, the book will be valuable for life scientists in all fields.

Market_Desc: This textbook is written for undergraduate students embarking on introductory course in Mechatronics and is also a reference book for engineers, and other practicing professionals, who are keen on understanding the principles of Mechatronic systems and engineering. Special Features: · Text presented in an integrated and lucid style. · Design of discrete control systems using fluid power circuits and PLCs explained. · User-friendly book with simple explanations and illustrations. · Many worked out examples and case studies. · Numerous illustrations, review questions, problems and exercises given. · Appendices, solved question and answers included in companion CD. · Instructor Manual CD with Powerpoint presentations and questionnaire to be made available in December 2008. About The Book: This book integrates the principles of electrical and electronic engineering with Mechatronic system application in a simple manner, and is designed for both mechanical/industrial engineers. This book enables one to design and select analog and digital circuits, microprocessor-based components, mechanical devices, sensors and actuators, and control devices to design modern mechatronic systems. Mechatronics - Integrated Mechanical Electronic System, consists of 16 chapters and each chapter begins with learning objectives and a brief introduction. Topics are then divided into labeled sections with explanations, examples, along with appropriate practical applications. A variety of solved problems with step by step solutions are included. Each chapter ends with key terms, summary of the chapter, objective type questions and exercises.

The first comprehensive reference on mechatronics, The Mechatronics Handbook was quickly embraced as the gold standard in the field. From washing machines, to coffeemakers, to cell phones, to the ubiquitous PC in almost every household, what, these days, doesn't take advantage of mechatronics in its design and function? In the scant five years since the initial publication of the handbook, the latest generation of smart products has made this even more obvious. Too much material to cover in a single volume Originally a single-volume reference, the handbook has grown along with the field. The need for easy access to new material on rapid changes in technology, especially in computers and software, has made the single volume format unwieldy. The second edition is offered as two easily digestible books, making the material not only more accessible, but also more focused. Completely revised and updated, Robert Bishop's seminal work is still the most exhaustive, state-of-the-art treatment of the field available.

This comprehensive volume provides a complete, authoritative, up-to-date reference for all aspects of power plant engineering. Coverage ranges from engineering economics to coal and limestone handling, from design processes to plant thermal heat balances. Both theory and practical applications are covered, giving engineers the information needed to plan, design,

construct, upgrade, and operate power plants. Power Plant Engineering is the culmination of experience of hundreds of engineers from Black & Veatch, a leading firm in the field for more than 80 years. The authors review all major power generating technologies, giving particular emphasis to current approaches. Special features of the book include: * More than 1000 figures and lines drawings that illustrate all aspects of the subject. * Coverage of related components and systems in power plants such as turbine-generators, feedwater heaters, condenser, and cooling towers. * Definitions and analyses of the features of various plant systems. * Discussions of promising future technologies. Power Plant Engineering will be the standard reference in the professional engineer's library as the source of information on steam power plant generation. In addition, the clear presentation of the material will make this book suitable for use by students preparing to enter the field.

Mc-Graw Hill Education is proud to announce the fourth edition of Manufacturing Technology, Volume 2 on Metal cutting and Machine Tools, by our well-known author P N Rao. With latest industrial case studies and expanded topical coverage, the textbook offers a deep knowledge of the ever-evolving subject. A dedicated section on chapter-wise GATE questions provide support to the competitive examinations' aspirants. This revised edition also maintains its principle of lucid presentation and easy to understand pedagogy. This makes the book a complete package on the subject which will greatly benefit students, teachers and practicing engineers. Salient Features: - Well organised description of equipment, from practical information to its process, supported with easy to understand illustrations, numerical calculation and discussion of the result. - Expanded topical coverage by adding One new chapter, on Micro-Manufacturing. Included new required topics like, Automation, Economics of Tooling, etc. - Latest Industrial Case Studies, like Turbine Blade Machining, Welding Fixture, etc.

Stem Cell Manufacturing discusses the required technologies that enable the transfer of the current laboratory-based practice of stem cell tissue culture to the clinic environment as therapeutics, while concurrently achieving control, reproducibility, automation, validation, and safety of the process and the product. The advent of stem cell research unveiled the therapeutic potential of stem cells and their derivatives and increased the awareness of the public and scientific community for the topic. The successful manufacturing of stem cells and their derivatives is expected to have a positive impact in the society since it will contribute to widen the offer of therapeutic solutions to the patients. Fully defined cellular products can be used to restore the structure and function of damaged tissues and organs and to develop stem cell-based cellular therapies for the treatment of cancer and hematological disorders, autoimmune and other inflammatory diseases and genetic disorders. Presents the first 'Flowchart' of stem cell manufacturing enabling easy understanding of the various processes in a sequential and coherent manner Covers all bioprocess technologies required for the transfer of the bench findings to the clinic including the process components: cell signals, bioreactors, modeling, automation, safety, etc. Presents comprehensive coverage of a true multidisciplinary topic by bringing together specialists in their particular area Provides the basics of the processes and identifies the issues to be resolved for large scale cell culture by the bioengineer Addresses the critical need in bioprocessing for the successful delivery of stem cell technology to the market place by involving professional engineers in sections of the book

This book gathers the best articles presented by researchers and industrial experts at the International Conference on "Innovative Design, Analysis and Development Practices in Aerospace and Automotive Engineering (I-DAD 2020)". The papers discuss new design concepts, and analysis and manufacturing technologies, with a focus on achieving improved performance by downsizing; improving the strength-to-weight ratio, fuel efficiency and operational capability at room and elevated temperatures; reducing wear and tear; addressing NVH aspects, while balancing the challenges of Euro VI/Bharat Stage VI emission norms, greenhouse effects and recyclable materials. Presenting innovative methods, this book is a valuable reference resource for professionals at educational and research organizations, as well as in industry, encouraging them to pursue challenging projects of mutual interest.

Integrated Gasification Combined Cycle (IGCC) Technologies discusses this innovative power generation technology that combines modern coal gasification technology with both gas turbine and steam turbine power generation, an important emerging technology which has the potential to significantly improve the efficiencies and emissions of coal power plants. The advantages of this technology over conventional pulverized coal power plants include fuel flexibility, greater efficiencies, and very low pollutant emissions. The book reviews the current status and future developments of key technologies involved in IGCC plants and how they can be integrated to maximize efficiency and reduce the cost of electricity generation in a carbon-constrained world. The first part of this book introduces the principles of IGCC systems and the fuel types for use in IGCC systems. The second part covers syngas production within IGCC systems. The third part looks at syngas cleaning, the separation of CO₂ and hydrogen enrichment, with final sections describing the gas turbine combined cycle and presenting several case studies of existing IGCC plants. Provides an in-depth, multi-contributor overview of integrated gasification combined cycle technologies Reviews the current status and future developments of key technologies involved in IGCC plants Provides several case studies of existing IGCC plants around the world

The book explores the challenges and opportunities associated with high-altitude agro-ecosystems and the factors that influence them. It discusses the various indigenous agricultural practices and approaches, as well as the microbiology of mountain & hill agro-ecosystems, providing a comprehensive overview of the various factors that control the microbiome at high altitudes. The contributions examine microbiological advances, such as use of "omics" technologies for hill agriculture and environmental sustainability, and explore the use of nanotechnology for agricultural and environmental sustainability at higher altitudes. The book also describes various aspects of low-temperature microbiology in the context of high-altitude farming and environmental sustainability.

The probability for exposure to damaging radiation, toxic chemicals in the environment and adverse biological agents has increased exponentially today. The more frequent and faster travel that we experience today also escalates the risk of contraction and transmission of potentially deadly infections. This has created a very real and escalating risk for

injuries and deaths. This is accentuated in the military and medical staff that is more frequently exposed to radiological, chemical, and biological agents in their normal working environment. Understanding the mechanisms whereby these toxic agents inflict damage to our bodies is essential to prepare us for these challenges. Much of the damage is inflicted through the generation of free radicals and non-radical oxidants which then act through oxidative mechanisms to injury the body. This volume will discuss the damage caused by these radiological, chemical, and biological environmental stressors, the mechanisms through which the damage can occur and the novel strategies that can be used to reduce the injury inflicted by these toxic compounds. Using basic and clinical research approaches, the contents of this book discuss new ideas for the development of bioactive products and environmental approaches to lessen or negate the biological damage inflicted by these noxious compounds.

This substantially revised second edition takes into account the provisions of the revised Indian Code of practice for Plain and Reinforced Concrete IS 456 : 2000. It also provides additional data on detailing of steel to make the book more useful to practicing engineers. The chapter on Limit State of Durability for Environment has been completely revised and the new provisions of the code such as those for design for shear in reinforced concrete, rules for shearing main steel in slabs, lateral steel in columns, and stirrups in beams have been explained in detail in the new edition. This comprehensive and systematically organized book is intended for undergraduate students of Civil Engineering, covering the first course on Reinforced Concrete Design and as a reference for the practicing engineers. Besides covering IS 456 : 2000, the book also deals with the British and US Codes. Advanced topics of IS 456 : 2000 have been discussed in the companion volume Advanced Reinforced Concrete Design (also published by Prentice-Hall of India). The two books together cover all the topics in IS 456 : 2000 and many other topics which are so important in modern methods of design of reinforced concrete.

Machine Design is interdisciplinary and draws its matter from different subjects such as Thermodynamics, Fluid Mechanics, Production Engineering, Mathematics etc. to name a few. As such, this book serves as a databook for various subjects of Mechanical Engineering. It also acts as a supplement to our popular book, Design of Machine Elements. It's a concise, updated data handbook that maps with the syllabi of all major universities and technical boards of India as well as professional examining bodies such as Institute of Engineers.

Power Plant Engineering Tata McGraw-Hill Education Power Plant Engineering Power Plant Engineering Springer Science & Business Media

Low-Rank Coals for Power Generation, Fuel and Chemical Production provides a thorough introduction to lignite (brown coal) and subbituminous coals and explores how they can be used efficiently and economically in place of hard coal. The book examines the undesirable characteristics of low-quality coals, such as high moisture content, low calorific value, and aggressive ash characteristics, and the resulting refinements to standard technologies and practices required for successful combustion, gasification, and pyrolysis. The first part of this book provides a comprehensive and systematic review of the properties of low-rank coals and corresponding preparation methods, such as drying, cleaning, and upgrading. Power generation from low-rank coals is the focus of Part 2, with chapter topics ranging from high efficiency pulverized coal combustion and circulating fluidized bed combustion to emerging areas such as chemical looping and oxyfuel combustion. The final contributions address the important subjects of coal-to-liquids, polygeneration and coke production using low-rank coals, as well as the critical issue of carbon capture and storage. This book is a valuable resource for power generation engineers and researchers seeking to maximize the opportunities provided by these cheaper coal feedstocks for efficient and environmentally compatible power generation. Presents the most in-depth treatment of low-rank coals available Addresses both power generation and fuel production Includes coverage that spans pulverized coal combustion and emerging technologies, such as CFBC, UCG, CLC, and oxyfuel combustion

In this book anisotropic one-dimensional and two-dimensional nanoscale building blocks and their assembly into fascinating and qualitatively new functional structures embracing both hard and soft components are explained. Contributions from leading experts regarding important aspects like synthesis, assembly, properties and applications of the above materials are compiled into a reference book. The anisotropy, i.e. the direction-dependent physical properties, of materials is fascinating and elegant and has sparked the quest for anisotropic materials with useful properties. With such a curiosity, material scientists have ventured into the realm of nanometer length scale and have explored the anisotropic nanoscale building blocks such as metallic and nonmetallic particles as well as organic molecular aggregates. It turns out that the anisotropic nanoscale building blocks, in addition to direction-dependent properties, exhibit dimension and morphology dependence of physical properties. Moreover, ordered arrays of anisotropic nanoscale building blocks furnish novel properties into the resulting system which would be entirely different from the properties of individual ones. Undoubtedly, these promising properties have qualified them as enabling building blocks of 21st century materials science, nanoscience and nanotechnology. Readers will find this book professionally valuable and intellectually stimulating in the rapidly emerging area of anisotropic nanomaterials. Quan Li, Ph.D., is Director of the Organic Synthesis and Advanced Materials Laboratory at the Liquid Crystal Institute of Kent State University, where he is also Adjunct Professor in the Chemical Physics Interdisciplinary Program. He has directed research projects funded by US Air Force Research Laboratory (AFRL), US Air Force Office of Scientific Research (AFSOR), US Army Research Office (ARO), US Department of Defense Multidisciplinary University Research Initiative (DoD MURI), US National Science Foundation (NSF), US Department of Energy (DOE), US National Aeronautics and Space Administration (NASA), Ohio Third Frontier, and Samsung Electronics, among others.

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.

This book provides the reader with an understanding of the hazards involved in using electrical equipment in Potentially Explosive Atmospheres. It is based on the newly adopted international IEC79 Series of Standards that are now harmonizing and replacing older national Standards. Explosion-proof installations can be expensive to design, install and operate. The strategies and techniques described in this book can significantly reduce costs whilst maintaining plant safety. The book explains the associated terminology and its correct use - from Area Classification through to the selection of explosion-protected electrical apparatus, describing how protection is achieved and maintained in line with these international requirements. The IEC standards require that engineering staff and their management are trained effectively and safely in Hazardous Areas, and this book is designed to help fulfill that need. A basic understanding of instrumentation and electrical theory would be of benefit to the reader, but no previous knowledge of hazardous area installation is required. * An engineer's guide to the hazards and best practice for using electrical equipment in Potentially Explosive Atmospheres. * Fully in line with the newly adopted international standards, the IEC79 series. * Clear explanations of terminology and background information make this the most accessible book on this subject.

Advances in Environmental Pollution Management: Wastewater Impacts and Treatment Technologies has been designed to bind novel knowledge of wastewater pollution-induced impacts on various aspects of our environment. The book also contains novel methods and tools for the monitoring and treatment of produced wastewater.

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