

1st Year Jntua Engineering Material File Type

Ever since the discovery of graphene, two-dimensional layered materials (2DLMs) have been the central tool of the materials research community. The reason behind their importance is their superlative and unique electronic, optical, physical, chemical and mechanical properties in layered form rather than in bulk form. The 2DLMs have been applied to electronics, catalysis, energy, environment, and biomedical applications. The following topics are discussed in the book's fifteen chapters:

- The research status of the 2D metal-organic frameworks and the different techniques used to synthesize them.
- 2D black phosphorus (BP) and its practical application in various fields.
- Reviews the synthesis methods of MXenes and provides a detailed discussion of their structural characterization and physical, electrochemical and optical properties, as well as applications in catalysis, energy storage, environmental management, biomedicine, and gas sensing.
- The carbon-based materials and their potential applications via the photocatalytic process using visible light irradiation.
- 2D materials like graphene, TMDCs, few-layer phosphorene, MXene in layered form and their heterostructures.
- The structure and applications of 2D perovskites.
- The physical parameters of pristine layered materials, ZnO, transition metal dichalcogenides, and heterostructures of layered materials are discussed.
- The coupling of graphitic carbon nitride with various metal sulfides and oxides to form efficient heterojunction for water purification.
- The structural features, synthetic methods, properties, and different applications and properties of 2D zeolites.
- The methods for synthesizing 2D hollow nanostructures are featured and their structural aspects and potential in medical and non-medical applications.
- The characteristics and structural aspects of 2D layered double hydroxides (LDHs) and the various synthesis methods and role of LDH in non-medical applications as adsorbent, sensor, catalyst, etc.
- The synthesis of graphene-based 2D layered materials synthesized by using top-down and bottom-up approaches where the main emphasis is on the hot-filament thermal chemical vapor deposition (HFTCVD) method.
- The different properties of 2D h-BN and borophene and the various methods being used for the synthesis of 2D h-BN, along with their growth mechanism and transfer techniques.
- The physical properties and current progress of various transition metal dichalcogenides (TMDC) based on photoactive materials for photoelectrochemical (PEC) hydrogen evolution reaction.
- The state-of-the-art of 2D layered materials and associated devices, such as electronic, biosensing, optoelectronic, and energy storage applications.

The work presents optimization of process parameters in wire electrical discharge machining process.

This volume originates from the proceedings of a multidisciplinary conference, Techno-Societal 2016 in Maharashtra, India, that brings together faculty members of various engineering colleges to solve Indian regional relevant problems under the guidance of eminent researchers from various reputed organizations. The focus is on technologies that help develop and improve society, in particular on issues such as the betterment of differently abled people, environment impact, livelihood, rural employment, agriculture, healthcare, energy, transport, sanitation, water, education. This conference aims to help innovators to share their best practices or products developed to solve specific local problems which in turn may help the other researchers to take inspiration to solve problems in their region. On the other hand, technologies proposed by expert researchers may find applications in different regions. This back and forth process for local-global interaction will help in solving local problems by global approach and help in solving global problems by improving local conditions.

Spectroscopy of Lanthanide Doped Oxide Materials provides a comprehensive overview on the most essential characterization techniques of these materials, along with their key applications. The book describes the application of optical spectroscopy of lanthanides doped inorganic phosphor hosts and gives information about their structure and morphology, binding energies, energy of transition and band gap. Also discussed are the properties and applications of rare earth doped inorganic materials and the barriers and potential solutions to enable the commercial realization of phosphors in important applications. The book reviews key information for those entering the field of phosphor research, along with the fundamental knowledge of the properties of transition series elements under UV/Visible/NIR light exposer. Low-cost materials methods to synthesize the materials and spectroscopic characterization methods are also detailed. Reviews the barriers and potential solutions to enable commercial realization of inorganic phosphors Discusses low-cost material methods to synthesize and characterize lanthanide doped oxide materials Provides readers with a comprehensive overview on key properties for the most relevant applications, such as lighting and display, energy conversion and solar cell devices

This book brings together, and integrates the three principal areas of environmental engineering water, air, and solid waste management. It introduces a unique approach by emphasizing the relationship between the principles observed in natural purification processes and those employed in engineered systems. First, the physical, chemical, mathematical, and biological principles that define, measure and quantify environmental quality are described. Next, the processes by which nature assimilates waste material are discussed and the natural purification processes that form the basis of engineered systems are detailed. Finally, the engineering principles and practices involved in the design and operation of environmental engineering works are covered at length. Written in a lucid style and offering abundant illustrations and problems, the book provides a treatment of environmental engineering that can be understood by a wide range of readers.

This proceedings volume consists of papers focusing on repairing, maintaining, rehabilitating, and retrofitting of existing infrastructures to extend their life and maximize economic return. Moreover, structural performance and material durability are discussed. Contributions fall under the following headings: (i) Concrete durability aspects, (ii)

Probability and Statistics & Complex Variables

This book includes original, peer-reviewed research from the 3rd International Conference on Emerging Trends in Electrical, Communication and Information Technologies (ICECIT 2018), held at Srinivasa Ramanujan Institute of Technology, Ananthapuramu, Andhra Pradesh, India in December 2018. It covers the latest research trends and developments in the areas of Electrical Engineering, Electronic and Communication Engineering, and Computer Science and Information.

The book covers the entire spectrum of magnetic nanomaterials and their highly interesting properties. It also discusses engineering strategies and current applications of magnetic nanomaterials in analytical chemistry, spintronics, biomedical science, electrochemistry, energy storage and conversion, membranes and fuel cells. Keywords: Magnetic Nanomaterials, Analytical Chemistry, Biomedical Science, Spintronics, Electrochemistry, Energy Storage, Energy Conversion, Membranes, Fuel Cells, Bio-Sensors, Electrocatalysis, Separation Processes, Hydrogen Storage, Supercapacitors, SERS Effect.

Mechanics of Structures and Materials: Advancements and Challenges is a collection of peer-reviewed papers presented at the 24th Australasian Conference on the Mechanics of Structures and Materials (ACMSM24, Curtin University, Perth, Western Australia, 6-9

December 2016). The contributions from academics, researchers and practising engineers from Australasian, Asia-pacific region and around the world, cover a wide range of topics, including: • Structural mechanics • Computational mechanics • Reinforced and prestressed concrete structures • Steel structures • Composite structures • Civil engineering materials • Fire engineering • Coastal and offshore structures • Dynamic analysis of structures • Structural health monitoring and damage identification • Structural reliability analysis and design • Structural optimization • Fracture and damage mechanics • Soil mechanics and foundation engineering • Pavement materials and technology • Shock and impact loading • Earthquake loading • Traffic and other man-made loadings • Wave and wind loading • Thermal effects • Design codes

Mechanics of Structures and Materials: Advancements and Challenges will be of interest to academics and professionals involved in Structural Engineering and Materials Science.

Metal–organic frameworks (MOFs) are porous crystalline polymers constructed by metal sites and organic building blocks. Since the discovery of MOFs in the 1990s, they have received tremendous research attention for various applications due to their high surface area, controllable morphology, tunable chemical properties, and multifunctionalities, including MOFs as precursors and self-sacrificing templates for synthesizing metal oxides, heteroatom-doped carbons, metal-atoms encapsulated carbons, and others. Thus, awareness and knowledge about MOFs and their derived nanomaterials with conceptual understanding are essential for the advanced material community. This breakthrough new volume aims to explore down-to-earth applications in fields such as biomedical, environmental, energy, and electronics. This book provides an overview of the structural and fundamental properties, synthesis strategies, and versatile applications of MOFs and their derived nanomaterials. It gives an updated and comprehensive account of the research in the field of MOFs and their derived nanomaterials. Whether as a reference for industry professionals and nanotechnologists or for use in the classroom for graduate and postgraduate students, faculty members, and research and development specialists working in the area of inorganic chemistry, materials science, and chemical engineering, this is a must-have for any library.

The book is a conference proceeding on adoption and application of sustainable, Manageable, Appropriate, Rational and Transferable (SMART) Technologies in all sectors of development.

Engineering Mathematics-I

Any good text book, particularly that in the fast changing fields such as engineering & technology, is not only expected to cater to the current curricular requirements of various institutions but also should provide a glimpse towards the latest developments in the concerned subject and the relevant disciplines. It should guide the periodic review and updating of the curriculum.

This book gathers selected high-quality research papers presented at the IconSWM 2018 conference, which explore various aspects of urban mining. In addition, they discuss how to achieve sustainable waste management systems, urban mining, landfill mining, material recovery, circular economy, etc., with the aid of effective waste management practices. Additional topics covered include maximum resource circulation and efficiency, key differences between landfill mining and urban mining, and how urban mining can be combined with the concepts of circular economy and sustainability.

There is a great need to develop lithium-ion batteries with high power density. Much research is, therefore, devoted to designing high-performance electrode materials and electrolytes. The book reviews the fundamental concepts and recent advances in the areas of anodes, cathodes, electrolytes, separators, binders, fabrication of device assemblies and electrochemical performance. Keywords: Lithium-ion Batteries (LIBs), Fabrication of TiO₂ for LIBs, Nanomaterials, Conducting Polymers, 2D Transition Metal Dichalcogenides, Metal Sulphides, Magnetic Nanomaterials, Silicon Materials, Anodes, Cathodes, Electrolytes, Separators, Binders, Fabrication of Device Assemblies, and Electrochemical Performance of LIBs.

Optics|Crystal Structures And X–Ray Diffraction |Principles Of Quantum Mechanics And Electron Theory |Semiconductors|Magnetic Properties|Dielectric Properties|Superconductivity|Laser|Fiber Optics |Nanotechnology|Review Questions|Multiple Choice Question

This volume presents research papers on additive manufacturing (popularly known as 3D printing) and joining which were presented during the 7th International and 28th All India Manufacturing Technology, Design and Research conference 2018 (AIMTDR 2018). The contents of this volume present the latest technological advancements for improving the efficiency, accuracy and speed of the additive manufacturing process and in fusion and solid-state welding technologies, with a variety of technologies, including fused deposition modelling, poly jet 3D printing, weld deposition based technology, selective laser melting and important welding technologies being covered. This volume will be of interest to academicians, researchers, and practicing engineers alike.

This book provides a detailed study of geometrical drawing through simple and well-explained worked-out examples. It is designed for first-year engineering students of all branches. The book is divided into seven modules. A topic is introduced in each chapter of a module with brief explanations and necessary pictorial views. Then it is discussed in detail through a number of worked-out examples, which are explained using step-by-step procedure and illustrating drawings. Module A covers the fundamentals of manual drafting, lettering, freehand sketching and dimensioning of views. Module B describes two-dimensional drawings like geometrical constructions, conics, miscellaneous curves and scales. Three-dimensional drawings, such as projections of points, lines, plane lamina, geometrical solids and sections of them are well explained in Module C. Module D deals with intersection of surfaces and their developments. Drawing of pictorial views is illustrated in Module E, which includes isometric projection, oblique projection and perspective projections. Module F covers the fundamentals of machine drawing. Finally, in Module G the book introduces computer-aided drafting (CAD) to make the readers familiar with the state-of-the-art techniques of drafting. Key Features : Follows the International Standard Organization (ISO) code of practice for drawing. Includes a large number of dimensioned illustrations, worked-out examples, and university questions and answers to explain the geometrical drawing process. Contains chapter-end exercises to help students develop their drawing skills.

This book presents select peer reviewed proceedings of the International Conference on Applied Mechanical Engineering Research (ICAMER 2019). The book examines various areas of mechanical engineering namely design, thermal, materials, manufacturing and industrial engineering covering topics like FEA, optimization, vibrations, condition monitoring, tribology, CFD, IC engines, turbo-machines, automobiles, manufacturing processes, machining, CAM,

additive manufacturing, modelling and simulation of manufacturing processing, optimization of manufacturing processing, supply chain management, and operations management. In addition, recent studies on composite materials, materials characterization, fracture and fatigue, advanced materials, energy storage, green building, phase change materials and structural change monitoring are also covered. Given the contents, this book will be useful for students, researchers and professionals working in mechanical engineering and allied fields.

This book comprises select proceedings of the International Conference on Emerging Trends in Mechanical Engineering (ICETME 2018). The book covers various topics of mechanical engineering like computational fluid dynamics, heat transfer, machine dynamics, tribology, and composite materials. In addition, relevant studies in the allied fields of manufacturing, industrial and production engineering are also covered. The applications of latest tools and techniques in the context of mechanical engineering problems are discussed in this book. The contents of this book will be useful for students, researchers as well as industry professionals.

This publication is based on peer-reviewed manuscripts from the 2019 Conference on Drug Design & Discovery Technologies (CDDT) held at Ramaiah University of Applied Sciences, India. Providing a wide range of up to date topics on the latest advancements in drug design and discovery technologies, this book ensures the reader receives a good understanding of the scope of the field. Aimed at scientists, students, regulators, academics and consultants throughout the world, this book is an ideal resource for anyone interested in the state of the art in drug design and discovery.

Metal-Organic Frameworks for Chemical Reactions: From Organic Transformations to Energy Applications brings together the latest information on MOFs materials, covering recent technology in the field of manufacturing and design. The book covers different aspects of reactions from energy storage and catalysts, including preparation, design and characterization techniques of MOFs material and applications. This comprehensive resource is ideal for researchers and advanced students studying metal-organic frameworks in academia and industry. Metal-organic frameworks (MOFs) are nanoporous polymers made up of inorganic metal focuses connected by natural ligands. These entities have become a hot area of research because of their exceptional physical and chemical properties that make them useful in different fields, including medicine, energy and the environment. Since combination conditions strongly affect the properties of these compounds, it is especially important to choose an appropriate synthetic technique that produces a product with homogenous morphology, small size dispersion, and high thermal stability. Covers the synthetic advantages and versatile applications of metal-organic frameworks (MOFs) due to their organic-inorganic hybrid nature and unique porous structure Includes energy applications such as batteries, fuel storage, fuel cells, hydrogen evaluation reactions and super capacitors Features information on using MOFs as a replacement to conventional engineering materials because they are lightweight, less costly, environmentally-friendly and sustainable

This book gathers selected high-impact articles from the 1st International Conference on Data Science, Machine Learning & Applications 2019. It highlights the latest developments in the areas of Artificial Intelligence, Machine Learning, Soft Computing, Human-Computer Interaction and various data science & machine learning applications. It brings together scientists and researchers from different universities and industries around the world to showcase a broad range of perspectives, practices and technical expertise.

This book gathers outstanding papers presented at the International Conference on Advances in Materials and Manufacturing Engineering (ICAMME 2019), held at KIIT Deemed to be University, Bhubaneswar, India, from 15 to 17 March 2019. It covers theoretical and empirical developments in various areas of mechanical engineering, including manufacturing, production, machine design, fluid/thermal engineering, and materials.

Alloy Materials and Their Allied Applications provides an in-depth overview of alloy materials and applications. The 11 chapters focus on the fabrication methods and design of corrosion-resistant, magnetic, biodegradable, and shape memory alloys. The industrial applications in the allied areas, such as biomedical, dental implants, abrasive finishing, surface treatments, photocatalysis, water treatment, and batteries, are discussed in detail. This book will help readers solve fundamental and applied problems faced in the field of allied alloys applications.

Experimental Aerodynamics provides an up to date study of this key area of aeronautical engineering. The field has undergone significant evolution with the development of 3D techniques, data processing methods, and the conjugation of simultaneous measurements of multiple quantities. Written for undergraduate and graduate students in Aerospace Engineering, the text features chapters by leading experts, with a consistent structure, level, and pedagogical approach.

Fundamentals of measurements and recent research developments are introduced, supported by numerous examples, illustrations, and problems. The text will also be of interest to those studying mechanical systems, such as wind turbines. Battery technology is constantly changing, and the concepts and applications of these changes are rapidly becoming increasingly more important as more and more industries and individuals continue to make "greener" choices in their energy sources. As global dependence on fossil fuels slowly wanes, there is a heavier and heavier importance placed on cleaner power sources and methods for storing and transporting that power. Battery technology is a huge part of this global energy revolution. Potassium-ion batteries were first introduced to the world for energy storage in 2004, over two decades after the invention of lithium-ion batteries. Potassium-ion (or "K-ion") batteries have many advantages, including low cost, long cycle life, high energy density, safety, and reliability. Potassium-ion batteries are the potential alternative to lithium-ion batteries, fueling a new direction of energy storage research in many applications and across industries. Potassium-ion Batteries: Materials and Applications explores the concepts, mechanisms, and applications of the next-generation energy technology of potassium-ion batteries. Also included is an in-depth overview of energy storage materials and electrolytes. This is the first book on this technology and serves as a reference guide for electrochemists, chemical engineers, students, research scholars, faculty, and R&D professionals who are working in electrochemistry, solid-state science, material science, ionics, power sources, and renewable energy storage fields.

As demand has increased for new types of equipment that are more suited to the ever-evolving world of industry, demand for both new and traditional types of actuators has soared. From automotive and aeronautical to biomedical and robotics, engineers are constantly developing actuating devices that are adapted to their particular needs in their particular field, and actuators are used in almost every field of engineering that there is. This volume not only lays out the fundamentals of actuators, such as how they operate, the different kinds, and their various applications, but it also informs the engineer or student about the new actuators that are being developed and the state-of-the-art of actuators. Edited and written by highly experienced and well-respected engineers with a deep understanding of their subject, there is no other volume on actuators that is more current or comprehensive. Whether as a guide for the latest innovations in actuators, a refresher reference work for the veteran engineer, or an introductory text for the engineering student, this is a must-have for any engineer's or university's library. Covering the theory and the practical applications, this breakthrough volume is a "one stop shop" for any engineer or student interested in actuators.

The book is designed to help the first year engineering students in building their concepts in the course on Programming for Problem Solving. It introduces the subject in a simple and lucid manner for a better understanding. It adopts a student friendly approach to the subject matter with many solved examples and unsolved questions, illustrations and well-structured C programs. This book presents select proceedings of the International Conference on Advanced Lightweight Materials and Structures (ICALMS) 2020, and discusses the triad of processing, structure, and various properties of lightweight materials. It provides a well-balanced insight into materials science and mechanics of both synthetic and natural composites. The book includes topics such as nano composites for lightweight structures, impact and failure of structures, biomechanics and biomedical engineering, nanotechnology and micro-engineering, tool design and manufacture for producing lightweight components, joining techniques for lightweight structures for similar and dissimilar materials, design for manufacturing, reliability and safety, robotics, automation and control, fatigue and fracture mechanics, and friction stir welding in lightweight sandwich structures. The book also discusses latest research in composite materials and their applications in the field of aerospace, construction, wind energy, automotive, electronics and so on. Given the range of topics covered, this book can be a useful resource for beginners, researchers and professionals interested in the wide ranging applications of lightweight structures.

The book presents selected research papers on current developments in the field of soft computing and signal processing from the International Conference on Soft Computing and Signal Processing (ICSCSP 2018). It includes papers on current topics such as soft sets, rough sets, fuzzy logic, neural networks, genetic algorithms and machine learning, discussing various aspects of these topics, like technological, product implementation, contemporary research as well as application issues.

Applications of Advanced Ceramics in Science, Technology, and Medicine explores a broad range of advanced ceramic materials and their innovative applications in distinct fields. Chapters cover applications such as actuators, energy storage, environmental health and monitoring, 3D printing, electronics, biomedical engineering and EMI shielding. Chapters provide readers with an overview of the structural and fundamental properties, synthesis strategies and versatile applications of advanced ceramic materials and their composites. The information in the volume will be beneficial for students, research scholars, faculty members and R&D specialists working in the area of material science, nanotechnology, solid-state science, chemical engineering, power sources and renewable energy storage.

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