Progress in Materials Manufacturing, and Energy Systems

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Preface

In an era defined by rapid technological transformation and interdisciplinary convergence, engineering research continues to be the cornerstone of innovation and societal progress. **Progress in Materials, Manufacturing, and Energy Systems** presents a curated collection of scholarly work that reflects the dynamic landscape of modern engineering. This volume encapsulates recent advances across diverse domains, including mechanical systems, materials development, data-driven modeling, smart manufacturing, and sustainable engineering practices.

The chapters in this book underscore the breadth and depth of ongoing research efforts aimed at addressing real-world engineering challenges. From novel fabrication methods and surface engineering techniques to nanotechnology, the contributions reflect both theoretical rigor and practical relevance. Emphasis has been placed on emerging applications that bridge traditional boundaries—integrating mechanics, computation, automation, and sustainability.

This compilation serves as a vital resource for researchers, practitioners, academicians, and students who aspire to stay abreast of contemporary trends and transformative technologies in engineering. Each chapter not only contributes to academic discourse but also opens new pathways for industrial innovation and interdisciplinary exploration.

We are deeply grateful to the contributing authors for their commitment and insightful contributions. Special thanks to Swami Vivekananda University, Kolkata, for its continuous encouragement and institutional support. We also extend our appreciation to the editorial and review teams for their meticulous efforts in upholding the academic integrity of this publication.

It is our sincere hope that this book inspires further research, fosters meaningful collaboration, and fuels innovation in engineering applications for years to come.

Dr. Ranjan Kumar
Dr. Arnab Das

Acknowledgement

We extend our heartfelt gratitude to Swami Vivekananda University, Kolkata, India, for their steadfast support and encouragement in the development of Progress in Materials, Manufacturing, and Energy Systems. The university's unwavering commitment to academic excellence, research advancement, and interdisciplinary learning has been a driving force behind the realization of this volume.

We are particularly thankful for the intellectually stimulating environment, cutting-edge research infrastructure, and collaborative ethos fostered by the institution. Swami Vivekananda University's focus on nurturing innovation across diverse engineering disciplines has enabled the convergence of valuable research insights presented in this book.

Our sincere appreciation goes to the esteemed external reviewers for their thoughtful evaluations and constructive feedback. Their diligence and scholarly expertise have played an essential role in ensuring the academic integrity and quality of this publication.

We also extend our deep thanks to all contributing authors, researchers, and members of the editorial team. Their dedication, persistence, and scholarly contributions have brought this collection to life. It is our hope that this book serves as a meaningful addition to the field of engineering and inspires continued inquiry, innovation, and collaboration.

With sincere gratitude,

Dr. Ranjan Kumar
Dr. Arnab Das

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