Preface

This special edition presents a multidisciplinary view of emerging trends in materials science, technology development, manufacturing, and production equipment. Spanning topics from machining and additive processes to biomedical and green construction materials, the presented research results reflect the growing interdependence between innovation, environmental responsibility, and manufacturing.

Chapter 1: Machining and Forming explores conventional and advanced material shape methods through subtractive and plastic deformation processes. This includes grinding, wire electrical discharge machining, and single-point incremental forming techniques, focusing on tool-material interactions, surface integrity, and process optimisation—essential for producing high-performance components across industrial sectors.

Chapter 2: Additive Manufacturing examines the transformative capabilities of layer-wise material deposition technologies. Covering process classification, design strategies, material challenges, and industrial applications, this chapter highlights how additive manufacturing enables customisation, rapid prototyping, and lightweight design.

Chapter 3: Materials for Biomedical Applications focuses on biocompatible materials and analysis of drug delivery possibilities of nanocomposite hydrogels.

Chapter 4: Engineering of Technological Machines and Equipment delves into the design, analysis, and optimisation of machines and equipment used in industrial production.

Chapter 5: Green Building Materials addresses the development and deployment of environmentally responsible construction materials. Emphasis is placed on waste applications, lifecycle performance, and mechanical properties, aligning with global efforts to create sustainable, climate-resilient infrastructure.

This special edition is designed for a broad audience, including researchers, engineers, and graduate students engaged in materials and technologies development, biomedical engineering, and sustainable construction. Each chapter combines rigorous analysis with applied relevance to inspire innovation across disciplines.