Machining is one of the most important manufacturing processes. Parts manufactured by other processes often require further operations before the product is ready for application. "Machining: Fundamentals and Recent Advances" is divided into two parts. Part I explains the fundamentals of machining, with special emphasis on three important aspects: mechanics of cutting, tools, and work-piece integrity. Part II is dedicated to recent advances in machining, including: machining of hard materials, machining of metal matrix composites, drilling polymeric matrix composites, ecological machining (minimal quantity of lubrication), high-speed machining (sculptured surfaces), grinding technology and new grinding wheels, micro- and nano- machining, very high-speed non-traditional machining processes, and intelligent machining (computational methods and optimization). Advanced students, researchers and professionals interested or involved in modern manufacturing engineering will find the book a useful reference.

Machining Dynamics: Fundamentals and Recent Advances. The mechanistic and physical background of machining dynamics is introduced. This book deals with the performance of the machine tools and the machined surfaces. The dynamics of machine tools, the mechanics of cutting, and the formulation of the fundamental governing equations are described. The book includes case studies and practical examples to illustrate the application of the fundamental theory to real-world machining processes. It discusses contemporary issues such as advanced cutting tools, workpiece vibrations, cutting fluid applications, and the integration of machine tool dynamics into CAD/CAM systems. The second edition has been thoroughly revised and updated to include the latest developments in the field of metal forming technology.
The creation of a Fifth Edition is proof of the continuing vitality of the book's contents, including: tool design and materials; jigs and fixtures; workholding principles; die manipulation; inspection, gaging, and tolerances; computer hardware and software and their applications; joining processes; and pressworking tool design. To stay abreast of the newer developments in manufacturing, every effort has been made to press those that are currently finding applications in the field. For example, sections on rapid prototyping, hydromforming, and simulation have been added or enhanced. The basic principles and methods discussed in Fundamentals of Tool Design can be used by both students and professionals for designing efficient tools.

Machine elements design involves removing stress and strain induced in metals and nonmetals in the processes of laser heating, analyze the results, offer the ways of laser treatment that dispense with subsequent machining operations, and describe the basic approaches to increase the strength of materials during laser heating. Other topics include the practical methods of implementing the processes of laser welding, cutting, hardening, alloying, and cladding (hardfacing). Basics of laser material processing is the broad term used to describe removal of material from a workpiece, and covers chip formation operations including: turning, milling, drilling and grinding. Recently the industrial utilization of non-traditional machining processes such as ultrasonic and abrasive jet machining has increased. The performance characteristics of machine tools and the significant development of existing and new processes and machines, are considered. Nowadays, in Europe, USA, Japan and countries with emerging economies machine tools has a sector with great technological evolution. Includes high quality articles (full research articles, review articles and case studies) with a special emphasis on research and development in machining and machine tools. Machining and machine tools is an important subject with application in several industries. Parts manufactured by other processes often require further operations before the product is ready for application. Traditional machining is the broad term used to describe removal of material from a workpiece, and covers chip formation operations including: turning, milling, drilling and grinding. Recently the industrial utilization of non-traditional machining processes such as EDM (electrical discharge machining), AM (additive manufacturing), AM-based (laser-based additive manufacturing), AMR (abruptive water jet machining) and USM (ultrasonic machining) has increased. The performance characteristics of machine tools and the significant development of existing and new processes and machines, are considered. Nowadays, in Europe, USA, Japan and countries with emerging economies machine tools is a sector with great technological evolution. Includes high quality articles (full research articles, review articles and case studies) with a special emphasis on research and development in machining and machine tools. Machining is the most widespread metal-shaping process in the mechanical manufacturing industry. World-wide investment in metal machining tools increases year on year and the wealth of nations can be judged by it. This text - the most up-to-date in the field - provides in-depth discussion of the theory and application of metal machining at an advanced level. It begins with an overview of the development of metal machining and its role in the current industrial environment and continues with discussions of machine elements, materials and applications. It is designed to provide undergraduate and graduate students with an overview of the different machining processes and their applications. The book is designed to equip students with the knowledge required to undertake research on machining processes. The text is also an important reference tool for professional engineers. Professors Childa, Moukame, Obikika and Yamane are four of the leading authorities on metal machining and have worked together for many years. Of interest to all mechanical, manufacturing and materials engineers Theoretical and practical problems addressed.
Metal Cutting Mechanics outlines the fundamentals of metal cutting analysis, reducing the extent of empirical approaches to the problems as well as bridging the gap between design and manufacturing. The author distinguishes his work from other treatments by publishing the systems science approach to metal cutting processes based on the strain deformation zone, suggesting a distinct way towards predictability of the metal cutting process, devoting special attention to experimental methodology. Metal Cutting Mechanics provides an exceptional balance between general reading and research analysis, in terms of being an applied science.

Written by seasoned experts in the field, this reference explores efficient methods of design, structural analysis, and algorithmic formulation to: reduce waste, noise, and breakage in system function; identify faults in system construction; and achieve optimal machine tool performance. The authors investigate issues such as force, noise, vibration,

As the only comprehensive text focusing on metal shaping processes, which are still the most widely used processes in the manufacture of products and structures, Metal Shaping Processes carefully presents the fundamentals of metal shaping processes with their relevant applications. The treatment of the subject matter is adequately descriptive for those unfamiliar with the various processes and yet is sufficiently analytical for an introductory academic course in machining. The text, as well as the numerous illustrations and table of terminology, include clear and concise definitions of various subjects in the field. It also presents the manner in which they motivate and challenge students to present technically and economically viable solutions to the wide variety of questions and problems, including production design. It is the perfect textbook for students in mechanical, industrial, and manufacturing engineering. Each chapter begins with a three-level description of the contents: introduction, overview, and interesting points. With its plan and emphasis on the manufacturing steps, equipment, and tooling needed in production; manufacturing managers and supervisors; product design engineers; and maintenance and reliability managers and technicians. Each chapter begins with a brief highlighted outline of the tools and technology, followed by a more detailed breakdown, with the student and teacher clearly assessing the capabilities, limitations, and additional possibilities of the process and its competitive aspects. Features sections on product design considerations, which present guidelines on design for manufacturing in many of the chapters. Offers practical, understandable explanations, even for complex processes, and a detailed look at the cutting tool system. (Continued)

The book thoroughly illustrates the causes of various phenomena and their effects on machining practice. It includes description of machining processes outlining the merits and de-merits of various modelling approaches. Spread in 22 chapters, the book is divided into four sections: 1. Cutting Theory and Processes; 2. Cutting Tools and Wear; 3. Metal Cutting; 4. Machining Technology.

In the more than 15 years since the second edition of Fundamentals of Machining and Machine Tools was published, the industry has seen many changes. Students must keep up with developments in analytical modeling of machining processes, modern cutting tool materials, and the economics of machining. The bookNew Solved Examples Have Been Added. * New Material On Tool Technology. * Improved Quality Of Figures And More Photographs.

About the Book: This book is an attempt to consolidate the basic scientific studies in the machining area so that fundamental mechanics and other concepts related to primary machining processes could be understood. The book is essentially designed for students of mechanical engineering and those interested in the field. The various chapters in the book are designed to present a clear understanding of the basic principles of machining and their applications. The book is intended for use as a textbook for undergraduate and graduate students in various disciplines. It is also useful for research and development work in the field of mechanical engineering.

Machining technology for composite materials is an essential reference particularly for process designers and tool and production engineers in the field of composite manufacturing, but also for all those involved in the fabrication and assembly of composite structures, including the aerospace, marine, civil and leisure industry sectors. Provides an extensive overview of machining methods for composite materials Chapters analyse cutting forces, tool wear and surface quality. Cryogenic machining and processes for wood based composites are discussed.

With its renowned editor and distinguished team of international contributors, Machining technology for composite materials is an essential reference particularly for process designers and tool and production engineers in the field of composite manufacturing, but also for all those involved in the fabrication and assembly of composite structures, including the aerospace, marine, civil and leisure industry sectors. Provides an extensive overview of machining methods for composite materials Chapters analyse cutting forces, tool wear and surface quality. Cryogenic machining and processes for wood based composites are discussed.

Design Principles of Metal-Cutting Tool Design discusses the fundamentals aspects of machine tool design. The book covers the design consideration of metal-cutting machine, such as static and dynamic stiffness, operational speeds, gears, manual and automatic control. The text first details the data calculation and the general requirements of the machine tool. Next, the book discusses the design principles, which include stiffness, accuracy, and reliability of the machine tool. Finally, the book covers the design of cutting tools, including their selection and application.
Ultrasonic Welding of Metal Sheets covers various aspects of ultrasonic welding (USW) of metal sheets, including the discussion on modeling and numerical simulations of ultrasonic welding to improve this welding process and performance. This book aims to provide an accessible, comprehensive and up-to-date exposition of the various aspects of joining of dissimilar metal sheets ranging from its fundamentals thorough to metallurgical characteristics covering fundamental concepts, in-detailed explanation about the USW including its implementation, design criteria, work material, welding, thermo-mechanical and research scopes. The book is aimed at researchers, professionals and graduate students in manufacturing, welding, mechanical engineering. Features The ultrasonic spot welding of various metal sheets is described in simplified expression and concepts are elucidated by relevant illustrations. Discusses modeling and numerical simulations of ultrasonic welding to improve the ultrasonic welding process and performance As opposed to competition in the market, this title provides thorough clarification of ultrasonic spot welding of metal sheets with its applications.