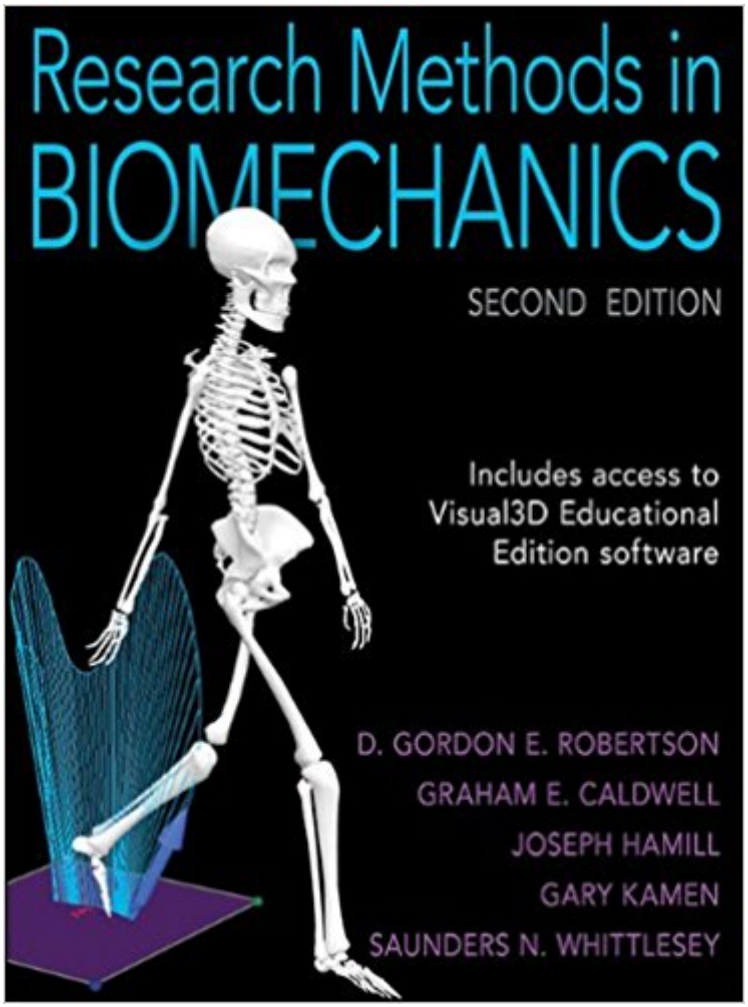
Research Methods In Biomechanics-2nd Edition



Synopsis

Research Methods in Biomechanics, Second Edition, demonstrates the range of available research techniques and how to best apply this knowledge to ensure valid data collection. In the highly technical field of biomechanics, research methods are frequently upgraded as the speed and sophistication of software and hardware technologies increase. With this in mind, the second edition includes up-to-date research methods and presents new information detailing advanced analytical tools for investigating human movement. Expanded into 14 chapters and reorganized into four parts, the improved second edition features more than 100 new pieces of art and illustrations and new chapters introducing the latest techniques and up-and-coming areas of research. Also included is access to biomechanics research software designed by C-Motion, Visual3D Educational Edition, which allows users to explore the full range of modeling capabilities of the professional Visual3D software in sample data files as well as display visualizations for other data sets. Additional enhancements in this edition include the following: â ¢ Special features called From the Scientific Literature highlight the ways in which biomechanical research techniques have been used in both classic and cutting-edge studies. â ¢ An overview, summary, and list of suggested readings in each chapter guide students and researchers through the content and on to further study. â ¢ Sample problems appear in select chapters, and answers are provided at the end of the text. â ¢ Appendixes contain mathematical and technical references and additional examples. â ¢ A glossary provides a reference for terminology associated with human movement studies. Research Methods in Biomechanics, Second Edition, assists readers in developing a comprehensive understanding of methods for quantifying human movement. Parts I and II of the text examine planar and three-dimensional kinematics and kinetics in research, issues of body segment parameters and forces, and energy, work, and power as they relate to analysis of two- and three-dimensional inverse dynamics. Two of the chapters have been extensively revised to reflect current research practices in biomechanics, in particular the widespread use of Visual3D software. Calculations from these two chapters are now located online with the supplemental software resource, making it easier for readers to grasp the progression of steps in the analysis. In part III, readers can explore the use of musculoskeletal models in analyzing human movement. This part also discusses electromyography, computer simulation, muscle modeling, and musculoskeletal modeling; it presents new information on MRI and ultrasound use in calculating muscle parameters. Part IV offers a revised chapter on additional analytical procedures, including signal processing techniques. Also included is a new chapter on movement analysis and dynamical systems, which focuses on how to assess and measure coordination and stability in changing movement patterns

and the role of movement variability in health and disease. In addition, readers will find discussion of statistical tools useful for identifying the essential characteristics of any human movement. The second edition of Research Methods in Biomechanics explains the mathematics and data collection systems behind both simple and sophisticated biomechanics. Integrating software and text, Research Methods in Biomechanics, Second Edition, assists both beginning and experienced researchers in developing their methods for analyzing and quantifying human movement.

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Customer Reviews

â œFrom how to understand and build concepts to new chapters on new techniques and research in the works, this provides a fine college-level analysis of the math and data collection systems behind biomechanics, and makes for a fine reference for any research interested in analyzing human movement.â • -- Midwest Book Review

D. Gordon E. Robertson, PhD, an emeritus professor and a fellow of the Canadian Society for Biomechanics, wrote Introduction to Biomechanics for Human Motion Analysis. He taught undergraduate- and graduate-level biomechanics at the University of Ottawa and previously at the University of British Columbia, Canada. He conducts research on human locomotion and athletic activities and authors the analogue data analysis software BioProc3. Graham E. Caldwell, PhD, an associate professor and a fellow of the Canadian Society for Biomechanics, teaches undergraduate- and graduate-level biomechanics at the University of Massachusetts at Amherst and previously held a similar faculty position at the University of Maryland. He won the Canadian

Society for Biomechanics New Investigator Award and in 1998 won the Outstanding Teacher Award for the School of Public Health and Health Sciences at the University of Massachusetts at Amherst. He served as an associate editor for Medicine and Science in Sports and Exercise. Joseph Hamill, PhD, is a professor and fellow of the Research Consortium, International Society of Biomechanics in Sports, Canadian Society for Biomechanics, American College of Sports Medicine, and National Academy of Kinesiology. He coauthored the popular undergraduate textbook Biomechanical Basis of Human Movement. He teaches undergraduate- and graduate-level biomechanics and is director of the Biomechanics Laboratory at the University of Massachusetts at Amherst. He serves on the editorial boards of several prestigious professional journals. He is adjunct professor at the University of Edinburgh in Scotland and the University of Limerick in Ireland and a distinguished research professor at Republic Polytechnic in Singapore. Gary Kamen, PhD, is a professor and fellow of the American Alliance for Health, Physical Education, Recreation and Dance; American College of Sports Medicine; and National Academy of Kinesiology. He authored an undergraduate textbook on kinesiology, Foundations of Exercise Science, as well as a primer on electromyography, Essentials of Electromyography.Â He was president of the Research Consortium of AAPHERD and teaches undergraduate and graduate courses in exercise neuroscience and motor control in the department of kinesiology at the University of Massachusetts at Amherst. Saunders (Sandy) N. Whittlesey, PhD, a graduate of the University of Massachusetts at Amherst, is a self-employed technology consultant specializing in athletic training, sporting goods, and clinical applications. Additional Contributors Norma Coffey, PhD, a postdoctoral researcher in statistics at the National University of Ireland at Galway, has expertise is functional data analysis and worked extensively with the Biomechanics Research Unit at the University of Limerick. Her current area of research involves applying functional data analysis techniques to time-course gene expression data. Timothy R. Derrick, PhD, a professor in the department of kinesiology at Iowa State University, has an extensive background in signal processing and conducts research on impacts to the human body particularly from the ground during running activities. Kevin Deluzio, PhD, is a professor in the department of mechanical and materials engineering at Queen’s University in Kingston, Canada, and held a similar position at Dalhousie University. He studies human locomotion to investigate the biomechanical factors of musculoskeletal diseases such as knee osteoarthritis. He is also interested in the design and evaluation of noninvasive therapies as well as surgical treatments such as total-knee replacement. Andrew (Drew) J. Harrison, PhD, is a senior lecturer in biomechanics in the department of physical education and sport sciences at the University of Limerick in Ireland and a fellow of the International Society for Biomechanics in Sport. He is the director of the

Biomechanics Research Unit at the University of Limerick. His research focuses on biomechanics of sport performance and sport injuries. Thomas M. Kepple, PhD, is an instructor in the department of health, nutrition, and exercise sciences at the University of Delaware. He worked for many years as a biomechanist at the National Institutes of Health on motion capture technology and gait laboratory instrumentation. Ross H. Miller, PhD, an assistant professor in the department of kinesiology at the University of Maryland, has published papers on static optimization and forward dynamics as well as methods on nonlinear techniques of data analysis. Scott Selbie, PhD, is an adjunct professor at Queen's University, Canada, and at the University of Massachusetts at Amherst. He is a graduate of Simon Fraser University, Canada. He is the director of research at C-Motion, developers of the Visual3D software, and president of HAS-Motion in Canada. Brian R. Umberger, PhD, is an associate professor teaching biomechanics at the undergraduate and graduate levels in the department of kinesiology at the University of Massachusetts at Amherst. In 2010, he received the Outstanding Teacher Award for the School of Public Health and Health Sciences at the University of Massachusetts at Amherst. In his research, he uses a combination of experimental, modeling, and simulation approaches to study the biomechanics and energetics of human locomotion. Richard E.A. van Emmerik, PhD, is a professor in the kinesiology department at the University of Massachusetts at Amherst, where he teaches motor control at the undergraduate and graduate levels. In his research, he applies principles from complex and nonlinear dynamical systems to the study of posture and locomotion.

New and good as expected.

Good

good

Only reason not 5 stars is because let's be honest, it is hard to "love" a textbook

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