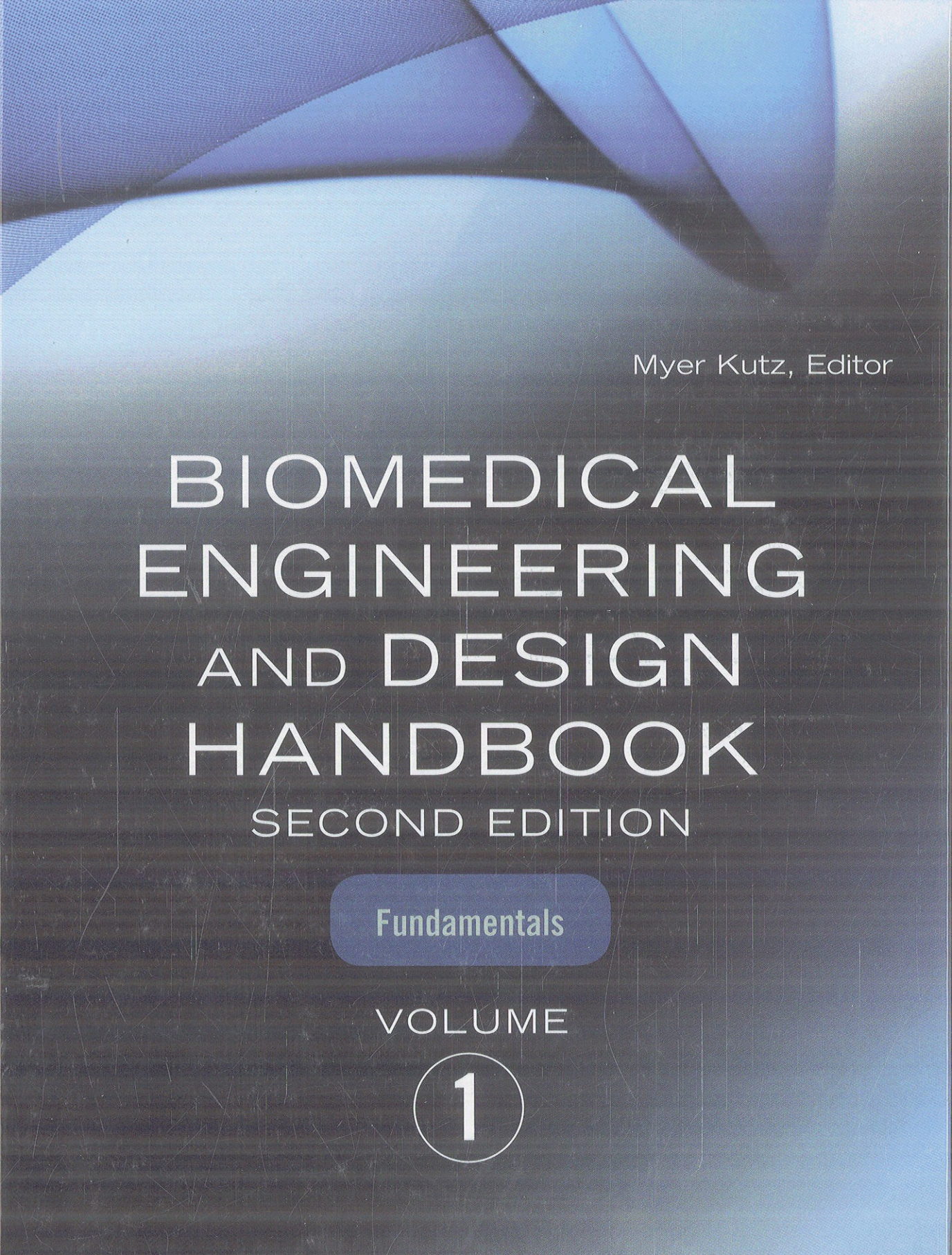




Myer Kutz, Editor

BIOMEDICAL ENGINEERING AND DESIGN HANDBOOK

SECOND EDITION

Fundamentals

VOLUME

1

CONTENTS

Contributors	xi
Vision Statement	xiii
Preface	xv
Preface to the First Edition	xvii

Part 1 Biomedical Systems Analysis

Chapter 1. Modeling of Biomedical Systems	<i>Narender P. Reddy</i>	3
---	--------------------------	---

Part 2 Biomechanics of the Human Body

Chapter 2. Heat Transfer Applications in Biological Systems	<i>Liang Zhu</i>	33
---	------------------	----

Chapter 3. Physical and Flow Properties of Blood	<i>David Elad and Shmuel Einav</i>	69
--	------------------------------------	----

Chapter 4. Respiratory Mechanics and Gas Exchange	<i>James B. Grotberg</i>	95
---	--------------------------	----

Chapter 5. Biomechanics of the Respiratory Muscles	<i>Anat Ratnovsky, Pinchas Halpern, and David Elad</i>	109
--	--	-----

Chapter 6. Biomechanics of Human Movement	<i>Kurt T. Manal and Thomas S. Buchanan</i>	125
---	---	-----

Chapter 7. Biomechanics of the Musculoskeletal System	<i>Marcus G. Pandy, Jonathan S. Merritt, and Ronald E. Barr</i>	153
---	---	-----

Chapter 8. Biodynamics: A Lagrangian Approach	<i>Donald R. Peterson and Ronald S. Adrezn</i>	195
---	--	-----

Chapter 9. Bone Mechanics	<i>Tony M. Keaveny, Elise F. Morgan, and Oscar C. Yeh</i>	221
---------------------------	---	-----

Chapter 10. Finite-Element Analysis	<i>Michael D. Nowak</i>	245
-------------------------------------	-------------------------	-----

Chapter 11. Vibration, Mechanical Shock, and Impact	<i>Anthony J. Brammer and Donald R. Peterson</i>	259
--	--	-----

Chapter 12. Electromyography as a Tool to Estimate Muscle Forces	<i>Qi Shao and Thomas S. Buchanan</i>	287
---	---------------------------------------	-----

Part 3 Biomaterials

Chapter 13. Biopolymers	<i>Christopher Batich and Patrick Leamy</i>	309
--------------------------------	---	-----

Chapter 14. Biomedical Composites	<i>Arif Iftekhhar</i>	339
--	-----------------------	-----

Chapter 15. Bioceramics	<i>David H. Kohn</i>	357
--------------------------------	----------------------	-----

Chapter 16. Cardiovascular Biomaterials	<i>Roger W. Snyder and Michael N. Helmus</i>	383
--	--	-----

Chapter 17. Dental Biomaterials	<i>Roya Zandparsa</i>	397
--	-----------------------	-----

Chapter 18. Orthopedic Biomaterials	<i>Michele J. Grimm</i>	421
--	-------------------------	-----

Chapter 19. Biomaterials to Promote Tissue Regeneration	<i>Nancy J. Meilander, Hyung-jung Lee, and Ravi V. Bellamkonda</i>	445
--	--	-----

Part 4 Bioelectronics

Chapter 20. Bioelectricity and Its Measurement	<i>Bruce C. Towe</i>	481
---	----------------------	-----

Chapter 21. Biomedical Signal Analysis	<i>Jit Muthuswamy</i>	529
---	-----------------------	-----

Chapter 22. Biomedical Signal Processing	<i>Hsun-Hsien Chang and Jose M. F. Moura</i>	559
---	--	-----

Chapter 23. Biosensors	<i>Bonnie Pierson and Roger J. Narayan</i>	581
-------------------------------	--	-----

Chapter 24. Bio Micro Electro Mechanical Systems—BioMEMS Technologies	<i>Teena James, Manu Sebastian Mannoor, and Dentcho Ivanov</i>	605
--	--	-----