## **CONTENTS**

Preface vii Accessing the Lab Acknowledgments		
Credits xv		
CHAPTER 15	Structure and Function of Body Systems  N. Travis Triplett, PhD	1
	Musculoskeletal System 2 • Neuromuscular System 8 • Cardiovascular System 12 • Respiratory System 15 • Conclusion 17 • Learning Aids 17	
CHAPTER 2	Biomechanics of Resistance Exercise  Jeffrey M. McBride, PhD	19
	Skeletal Musculature 20 • Anatomical Planes and Major Body Movements 25 • Human Strength and Power 25 • Sources of Resistance to Muscle Contraction 33 • Joint Biomechanics: Concerns in Resistance Training 37 • Conclusion 40 • Learning Aids 41	
CHAPTER 3	Bioenergetics of Exercise and Training	43
	Trent J. Herda, PhD, and Joel T. Cramer, PhD	
	Essential Terminology 44 • Biological Energy Systems 44 • Substrate Depletion and Repletion 55 • Bioenergetic Limiting Factors in Exercise Performance 56 • Oxygen Uptake and the Aerobic and Anaerobic Contributions to Exercise 57 • Metabolic Specificity of Training 59 • Conclusion 61 • Learning Aids 62	439
CHAPTER 4	Endocrine Responses to Resistance Exercise	65
201	William J. Kraemer, PhD, Jakob L. Vingren, PhD, and Barry A. Spiering, PhD	40
	Synthesis, Storage, and Secretion of Hormones 66 • Muscle as the Target for Hormone Interactions 69 • Role of Receptors in Mediating Hormonal Changes 69 • Categories of Hormones 70 • Heavy Resistance Exercise and Hormonal Increases 72 • Mechanisms of Hormonal Interactions 72 • Hormonal Changes in Peripheral Blood 73 • Adaptations in the Endocrine System 73 • Primary Anabolic Hormones 74 • Adrenal Hormones 82 • Other Hormonal Considerations 84 • Conclusion 85 • Learning Aids 86	
	Parameter and anomalous finishment and an analysis of the last of	

Exercise 103 • Compatibility of Aerobic and Anserobic Modes of Compatibility of Aerobic and Anserobic Modes of CHAPTER 13 • IATPAHO CHAPTER Aids 112

CHAPTER 5	Adaptations to Anaerobic Training Programs  Duncan French, PhD	87
	Neural Adaptations 88 • Muscular Adaptations 93 • Connective Tissue Adaptations 97 • Endocrine Responses and Adaptations to Anaerobic Training 102 • Cardiovascular and Respiratory Responses to Anaerobic Exercise 103 • Compatibility of Aerobic and Anaerobic Modes of Training 105 • Overtraining 107 • Detraining 110 • Conclusion 111 • Learning Aids 112	
CHAPTER 6	Adaptations to Aerobic Endurance Training Programs	115
	Ann Swank, PhD, and Carwyn Sharp, PhD	
pryngsk © 2016; 200 I rights reserved. Exc is on other means, no many and retrieval sy	Acute Responses to Aerobic Exercise 116 • Chronic Adaptations to Aerobic Exercise 120 • Adaptations to Aerobic Endurance Training 124 • External and Individual Factors Influencing Adaptations to Aerobic Endurance Training 124 • Overtraining: Definition, Prevalence, Diagnosis, and Potential Markers 129 • Conclusion 132 • Learning Aids 133	
CHAPTER 7	Age- and Sex-Related Differences	
	and Their Implications for Resistance Exercise	135
	Rhodri S. Lloyd, PhD, and Avery D. Faigenbaum, EdD	
	Children 136 • Female Athletes 144 • Older Adults 148 • Conclusion 153 • Learning Aids 154	
CHAPTER 8	Psychology of Athletic Preparation and Performance	155
over Designeso Keit	Traci A. Statler, PhD, and Andrea M. DuBois, MS	unless
	Role of Sport Psychology 156 • Ideal Performance State 156 • Energy Management: Arousal, Anxiety, and Stress 157 • Influence of Arousal and Anxiety on Performance 158 • Motivation 161 • Attention and Focus 163 • Psychological Techniques for Improved Performance 164 • Enhancing Motor Skill Acquisition and Learning 169 • Conclusion 172 • Learning Aids 173	
CHAPTER 9	Basic Nutrition Factors in Health	175
CHAFTEN	Marie Spano, MS, RD	1/5
As owner in this book	Role of Sports Nutrition Professionals 176 • Standard Nutrition Guidelines 178 • Macronutrients 181 • Vitamins 190 • Minerals 193 • Fluid and Electrolytes 196 • Conclusion 199 • Learning Aids 200	
CHAPTER 10	Nutrition Strategies for Maximizing Performance	201
CHAFTEN TO	Marie Spano, MS, RD MARIE Spano MS, RD MS, R	201
	Precompetition, During-Event, and Postcompetition Nutrition 202 • Nutrition Strategies for Altering Body Composition 216 • Feeding and Eating Disorders 221 • Conclusion 224 • Learning Aids 224	
CHAPTER 11	Performance-Enhancing Substances and Methods	225
	Bill Campbell, PhD	com
	Types of Performance-Enhancing Substances 226 • Hormones 228 • Dietary Supplements 237 • Conclusion 247 • Learning Aids 248	

CHAPTER 12	Principles of Test Selection and Administration Michael McGuigan, PhD	249
	Reasons for Testing 250 • Testing Terminology 250 • Evaluation of Test Quality 250 • Test Selection 253 • Test Administration 254 • Conclusion 257 • Learning Aids 258	
CHAPTER 13	Administration, Scoring, and Interpretation of Selected Tests	259
	Michael McGuigan, PhD	
	Measuring Parameters of Athletic Performance 260 • Selected Test Protocols and Scoring Data 264 • Statistical Evaluation of Test Data 291 • Conclusion 293 • Learning Aids 294	
CHAPTER 14	Warm-Up and Flexibility Training	317
	Ian Jeffreys, PhD	
	Warm-Up 318 • Flexibility 320 • Types of Stretching 323 • Conclusion 328 • Static Stretching Techniques 329 • Dynamic Stretching Techniques 341 • Learning Aids 350	
CHAPTER 15	Exercise Technique for Free Weight and Machine Training	351
OHAI TEH TO	Scott Caulfield, BS, and Douglas Berninger, MEd	
	Fundamentals of Exercise Technique 352 • Spotting Free Weight Exercises 354 • Conclusion 357 • Resistance Training Exercises 358 • Learning Aids 408	
CHAPTER 16	Exercise Technique for Alternative Modes	
all-inclusive pesoron	and Nontraditional Implement Training	409
	G. Gregory Haff, PhD, Douglas Berninger, MEd, and Scott Caulfield, BS	
The second edit	General Guidelines 410 • Bodyweight Training Methods 410 • Core Stability and Balance Training Methods 411 • Variable-Resistance Training Methods 413 • Nontraditional Implement Training Methods 417 • Unilateral Training 421 • Conclusion 421 • Modes and Nontraditional Exercises 422 • Learning Aids 438	ong with
CHAPTER 17	Program Design for Resistance Training	439
learning tools were	Jeremy M. Sheppard, PhD, and N. Travis Triplett, PhD	
	Principles of Anaerobic Exercise Prescription 440 • Step 1: Needs Analysis 441 • Step 2: Exercise Selection 443 • Step 3: Training Frequency 447 • Step 4: Exercise Order 448 • Step 5: Training Load and Repetitions 451 • Step 6: Volume 462 • Step 7: Rest Periods 465 • Conclusion 467 • Learning Aids 469	
CHAPTER 18	Program Design and Technique for Plyometric Training	471
	David H. Potach, PT, and Donald A. Chu, PhD, PT	
ernized and instructe to help keep this tex and instruction of	Plyometric Mechanics and Physiology 472 • Program Design 475 • Age Considerations 478 • Plyometrics and Other Forms of Exercise 480 • Safety Considerations 481 • Conclusion 482 • Plyometric Drills 483 • Learning Aids 520	

CHAPTER 19	Program Design and Technique for Speed and Agility Training Brad H. DeWeese, EdD, and Sophia Nimphius, PhD	521
	Speed and Agility Mechanics 522 • Neurophysiological Basis for Speed 525 • Running Speed 527 • Agility Performance and Change-of-Direction Ability 533 • Methods of Developing Speed 536 • Methods of Developing Agility 538 • Program Design 539 • Speed Development Strategies 541 • Agility Development Strategies 545 • Conclusion 547 • Speed and Agility Drills 548 • Learning Aids 557	
CHAPTER 20	Program Design and Technique for Aerobic Endurance Training	559
	Benjamin H. Reuter, PhD, and J. Jay Dawes, PhD	115
	Factors Related to Aerobic Endurance Performance 560 • Designing an Aerobic Endurance Program 561 • Types of Aerobic Endurance Training Programs 567 • Application of Program Design to Training Seasons 570 • Special Issues Related to Aerobic Endurance Training 571 • Conclusion 573 • Aerobic Endurance Training Exercises 574 • Learning Aids 581	
CHAPTER 21	Periodization	583
	G. Gregory Haff, PhD	
	Central Concepts Related to Periodization 584 • Periodization Hierarchy 587 • Periodization Periods 588 • Applying Sport Seasons to the Periodization Periods 592 • Undulating Versus Linear Periodization Models 593 • Example of an Annual Training Plan 593 • Conclusion 595 • Learning Aids 604	
CHAPTER 22	Rehabilitation and Reconditioning	605
	David H. Potach, PT, and Terry L. Grindstaff, PhD, PT, ATC	IALIO
	Sports Medicine Team 606 • Types of Injury 608 • Tissue Healing 610 • Goals of Rehabilitation and Reconditioning 611 • Program Design 616 • Reducing Risk of Injury and Reinjury 618 • Conclusion 620 • Learning Aids 621	
CHAPTER 23	Facility Design, Layout, and Organization	623
	Andrea Hudy, MA	
	General Aspects of New Facility Design 624 • Existing Strength and Conditioning Facilities 625 • Assessing Athletic Program Needs 625 • Designing the Strength and Conditioning Facility 627 • Arranging Equipment in the Strength and Conditioning Facility 628 • Maintaining and Cleaning Surfaces and Equipment 630 • Conclusion 631 • Learning Aids 633	
CHAPTER 24	Facility Policies, Procedures, and Legal Issues	641
	Traci Statler, PhD, and Victor Brown, MS	
	Mission Statement and Program Goals 642 • Program Objectives 642 • Strength and Conditioning Performance Team 643 • Legal and Ethical Issues 647 • Staff Policies and Activities 651 • Facility Administration 653 • Emergency Planning and Response 653 • Conclusion 655 • Learning Aids 656	
Answers to Study	Ouestions 657	

Answers to Study Questions 657
References 659
Index 721
About the Editors 731
Contributors 733
Contributors to Previous Editions 735