CONTENTS

Procedure Boxes  x
Preface  xi
Acknowledgments  xi
Introduction to the Course  xiii
To the Ophthalmologist  xiii
To the Student  xiv

1 INTRODUCTION TO OPHTHALMIC MEDICAL ASSISTING  1
What Is Ophthalmology?  1
Meet the Eye Care Team  2
  Ophthalmologist  2
  Optometrist  3
  Optician  3
  Registered Nurse  3
  Orthoptist  3
  Ocularist  3
  Ophthalmic Photographer  3
  Ophthalmic Medical Assistant  3
What Is Certification?  4
  Professional Development  5

2 ANATOMY AND PHYSIOLOGY OF THE EYE  9
The Eye as an Optical System  9
The Globe  10
The Adnexa  10
  Orbit  10
  Extraocular Muscles  10
  Eyelids and Conjunctiva  12
  Lacrimal Apparatus  13
The Eye  14
  Cornea and Sclera  14
  Anterior Chamber  15
  Uvea: Iris, Ciliary Body, Choroid  15
  Crystalline Lens  16
  Vitreous  16
  Retina  17
  Visual Pathway  19

3 DISEASES AND DISORDERS OF THE EYE  23
Mechanisms of Disease and Injury  23
  General Types  24
  Signs, Symptoms, and Syndromes  25
Abnormalities of the Adnexa  25
  Orbit  26
  Extraocular Muscles  26
  Eyelids  27
  Lacrimal Apparatus  28
Abnormalities of the Eye  29
  Conjunctiva  29
  Cornea and Sclera  30
  Anterior Chamber  31
  Uveal Tract  33
  Crystalline Lens  33
  Vitreous  34
  Retina  34
  Optic Nerve  36
  Visual Pathway  37

4 SYSTEMIC DISEASES AND OCULAR MANIFESTATIONS  41
Inflammatory and Autoimmune Diseases  42
  Myasthenia Gravis  42
  Rheumatoid Arthritis  42
  Sarcoidosis  42
  Sjögren Syndrome  43
Systemic Lupus Erythematosus 43
Thyroid Disorders 43
Multiple Sclerosis 44
Metabolic Disorders 44
Diabetes Mellitus 44
Vascular Diseases 45
  Cerebral Vascular Accident 45
  Giant Cell Arteritis 45
  Migraine 45
  Hypertension 46
Infectious Diseases 46
  Acquired Immunodeficiency Syndrome 46
  Chlamydial Infections 46
  Herpes Infections 47
  Histoplasmosis 47
  Syphilis 47
  Toxoplasmosis 47
Neoplastic Diseases 48
  Metastatic Carcinoma 48
  Blood Dyscrasias 48
  Cerebral Neoplasms 48

5 OPTICS AND REFRACTIVE STATES OF THE EYE 51
Principles of Optics 51
  Refraction 52
  Refractive Properties of Curved Lenses 53
  Convergence, Divergence, and Focal Point 53
  Lens Power and Focal Length 54
Refractive States of the Eye 55
  Emmetropia 55
  Myopia 55
  Types and Uses of Corrective Lenses 57
  Spheres 58
  Cylinders 59
  Spherocylinders 59
  Prism Power 60
Components of Refraction 61
  Retinoscopy 61
  Refinement 64
  Binocular Balancing 64
  Interpretation of Prescriptions 64
  Transposition of Prescriptions 65
  Automated Refractors 65
    Objective Refractors 66
    Subjective Refractors 66
    Objective/Subjective Refractors 66
  Lensometry 66
    Types of Lensmeters 66
    Elements of Lensometry 66
    Lensometry Technique for Multifocal Lenses 67
    Lensometry Technique for Prisms 69
    Placement of Optical Centers 69
  Keratometry 70

6 BASICS OF OPHTHALMIC PHARMACOLOGY 75
Delivery Systems of Drugs 76
  Topical Systems 76
  Injections 77
  Oral Systems 77
  Implants 78
Improving Compliance 78
Administration of Topical Eye Drops and Ointments 78
Purposes and Actions of Drugs 78
  Diagnostic Medications 78
  Therapeutic Medications 82
    Miotic Agents 82
    Glaucoma Medications 82
Interpretation of a Prescription 86
First Aid for Acute Drug Reactions 88

7 MICROORGANISMS AND INFECTION CONTROL 91
Types of Microorganisms 91
  Bacteria 92
  Viruses 93
  Fungi 95
  Protozoa 95
  Prions 96
Transmission of Infectious Diseases 96
   Airborne Droplets and Particles 96
   Direct-Contact Transmission 97
   Indirect-Contact Transmission 97
   Common-Vehicle Transmission 97
   Vector-Borne Transmission 97
Infection Control Precautions 98
   Hand Washing 99
   Use of Personal Protective Equipment 100
   Cleaning, Disinfection, and Sterilization 100
   Aseptic Technique: Handling Sterile Medical Equipment 101
   Handling and Decontaminating Contaminated Materials 102
   Hygienic Practices in Potentially Infectious Situations 102
Collecting Specimens for the Identification of Microorganisms 103

8 COMPREHENSIVE MEDICAL EYE EXAMINATION 105
   Overview of the Examination 106
      Aspects of Eye Function, Anatomy, and Physical Appearance and Condition 106
   Frequency of Examination 107
   Ophthalmic and Medical History 107
      Chief Complaint and History of Present Illness 107
      Past Ocular History 109
      General Medical and Social History 109
      Family Ocular and Medical History 110
      Allergies, Medications, and Supplements 110
      History-Taking Guidelines 110
   Visual Acuity Examination 111
      Distance Acuity Test 111
      Pinhole Acuity Test 112
      Near Acuity Test 112
      Other Acuity Tests 115
      Procedures Following Acuity Tests 115
   Alignment and Motility Examination 115
      Ancillary Tests to Be Performed Before Motility Testing 116
      Pupillary Examination 116
      Visual Field Examination 117
      Intraocular Pressure Measurement 119
         Principles of Tonometry 119
         Applanation Tonometry 120
         Indentation Tonometry 121
         Applanation Versus Indentation Tonometry 123
      Pachymetry 123
      External Examination 124
         Anterior Chamber Evaluation 124
            Biomicroscopy 124
            Gonioscopy 126
         Ophthalmoscopy 126
            Direct Ophthalmoscopy 126
            Indirect Ophthalmoscopy 126
      Additional Tests 127
         Color Vision Tests 127
         Tear Output Test 127
         Evaluating the Corneal and Conjunctival Epithelium 128
         Corneal Sensitivity Test 129
         Exophthalmometry 129

9 OCULAR MOTILITY 133
   Anatomy and Physiology 133
   Nerve Control 135
   Eye Movements 135
   Motility Examination 137
   Strabismus Tests 137
      Corneal Light Tests 137
      Cover Tests 137
      Additional Tests 138
   Summary 140

10 ADJUNCTIVE TESTS AND PROCEDURES 143
   Vision Tests for Patients With Opacities 143
      Visual Potential Tests 144
      Contrast-Sensitivity and Glare Tests 145
<table>
<thead>
<tr>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment of Corneal Abnormalities 146</td>
</tr>
<tr>
<td>Corneal Topography 146</td>
</tr>
<tr>
<td>Specular Microscopy/Photography 146</td>
</tr>
<tr>
<td>Ophthalmic Photography 147</td>
</tr>
<tr>
<td>Tomography 149</td>
</tr>
<tr>
<td>Ultrasonography 149</td>
</tr>
<tr>
<td>11 PRINCIPLES AND TECHNIQUES OF PERIMETRY 153</td>
</tr>
<tr>
<td>Anatomical Basis of the Visual Field 154</td>
</tr>
<tr>
<td>Map of the Visual Field 155</td>
</tr>
<tr>
<td>Orientation of the Visual Field Map 157</td>
</tr>
<tr>
<td>Purposes and Types of Perimetry 157</td>
</tr>
<tr>
<td>Kinetic Perimetry 158</td>
</tr>
<tr>
<td>Static Perimetry 160</td>
</tr>
<tr>
<td>Miscellaneous Visual Field Tests 163</td>
</tr>
<tr>
<td>Defects Shown by Perimetry 163</td>
</tr>
<tr>
<td>Generalized Defects 163</td>
</tr>
<tr>
<td>Focal Defects 164</td>
</tr>
<tr>
<td>Hemianopic and Quadrantanopic Defects 166</td>
</tr>
<tr>
<td>Other Defects 166</td>
</tr>
<tr>
<td>Conditions for Accurate Perimetry 169</td>
</tr>
<tr>
<td>Environment-Related Factors 169</td>
</tr>
<tr>
<td>Device-Related Factors 169</td>
</tr>
<tr>
<td>Patient-Related Factors 170</td>
</tr>
<tr>
<td>Examiner-Related Factors 170</td>
</tr>
<tr>
<td>12 FUNDAMENTALS OF PRACTICAL OPTICIANRY 173</td>
</tr>
<tr>
<td>Types of Corrective Lenses 173</td>
</tr>
<tr>
<td>Single-Vision Lenses 174</td>
</tr>
<tr>
<td>Multifocal Lenses 174</td>
</tr>
<tr>
<td>Types of Lens Materials 177</td>
</tr>
<tr>
<td>Lens Safety Standards 178</td>
</tr>
<tr>
<td>Lens Treatments, Tints, and Coatings 179</td>
</tr>
<tr>
<td>Key Measurements in Fitting Eyeglasses 179</td>
</tr>
<tr>
<td>Interpupillary Distance 179</td>
</tr>
<tr>
<td>Vertex Distance 183</td>
</tr>
<tr>
<td>Base Curve 184</td>
</tr>
<tr>
<td>13 LOW VISION 193</td>
</tr>
<tr>
<td>Visual Acuity and Low Vision 194</td>
</tr>
<tr>
<td>Common Causes of Low Vision 194</td>
</tr>
<tr>
<td>Increasing Awareness 195</td>
</tr>
<tr>
<td>Low Vision Care 195</td>
</tr>
<tr>
<td>Low Vision Aids 195</td>
</tr>
<tr>
<td>Low Vision Devices 196</td>
</tr>
<tr>
<td>Nonoptical Aids 198</td>
</tr>
<tr>
<td>Other Services 198</td>
</tr>
<tr>
<td>14 PRINCIPLES AND PROBLEMS OF CONTACT LENSES 201</td>
</tr>
<tr>
<td>Basic Principles 202</td>
</tr>
<tr>
<td>Characteristics of Contact Lenses 202</td>
</tr>
<tr>
<td>Contact Lenses Versus Eyeglasses for Vision Correction 203</td>
</tr>
<tr>
<td>Contact Lens Specification Versus Eyeglass Prescription 203</td>
</tr>
<tr>
<td>Types and Materials of Contact Lenses 203</td>
</tr>
<tr>
<td>Polymethyl Methacrylate and Rigid Gas-Permeable Contact Lenses 204</td>
</tr>
<tr>
<td>Soft Contact Lenses 204</td>
</tr>
<tr>
<td>Extended-Wear Contact Lenses 205</td>
</tr>
<tr>
<td>Daily-Wear Contact Lenses 205</td>
</tr>
<tr>
<td>Disposable Contact Lenses 205</td>
</tr>
<tr>
<td>Planned-Replacement Contact Lenses 205</td>
</tr>
<tr>
<td>Contact Lens Designs for Special Purposes 206</td>
</tr>
<tr>
<td>Cosmetic Fashion Contact Lenses 206</td>
</tr>
<tr>
<td>Cosmetic Restorative Contact Lenses 206</td>
</tr>
<tr>
<td>Toric Contact Lenses 206</td>
</tr>
<tr>
<td>Bifocal Contact Lenses 207</td>
</tr>
<tr>
<td>Keratoconus Contact Lenses 208</td>
</tr>
<tr>
<td>Therapeutic Contact Lenses 208</td>
</tr>
<tr>
<td>Care of Contact Lenses 208</td>
</tr>
<tr>
<td>Cleaning 209</td>
</tr>
</tbody>
</table>
Disinfecting  209
Lubrication    210
Storage        210
Insertion and Removal of Contact Lenses  210
Soft Contact Lenses    210
Rigid Contact Lenses    212
Problems With Contact Lenses    213
Allergy    213
Solution–Contact Lens Interaction    213
Overwearing Syndrome    214
Improper Contact Lens Fit    214
Giant Papillary Conjunctivitis    214
Irritation and Tearing    215
Corneal Problems    215
Inability to Insert or Remove Lenses    217
Lens “Lost” in the Eye    217
Contraindications for Contact Lenses    217

15 PATIENT INTERACTION, SCREENING, AND EMERGENCIES  221
Patient–Assistant Interaction    221
Patient Greeting    222
Patient Screening    222
Triage    222
Appointment Scheduling    224
Referred Patients    225
Emergencies in the Office    225
Burns    225
Trauma    226
General Emergency Assistance    229
Hospital Admission    229

16 PATIENTS WITH SPECIAL CONCERNS  235
All Patients Considered    236
Patients and Their Families    236
Health Insurance Portability and Accountability Act    236
Office Waiting Periods    236
Disruptive Patients    237
Visually Impaired or Blind Patients    237
Patient Greeting and History-Taking Guidelines    237
Offering Assistance    238
Visual Acuity Assessment    239
Infants and Young Children    239
Patient Greeting    239
Patient Positioning    239
Visual Acuity and Ability Testing    240
Older Patients    242
Age-Related Vision Changes    242
Visual Acuity Testing    243
Patients Who May Be Suffering From Abuse    243
Patients With Physical Disabilities    243
Patients With Diabetes Mellitus    244
Special Help for Patients With Diabetes Mellitus    244

17 MINOR SURGICAL ASSISTING IN THE OFFICE  249
Patient Preparation Before Surgery    249
Informed Consent    250
Preoperative Assessment    250
Patient Assistance    250
Administration of Anesthetics    251
Surgical Materials and Instruments    251
Preparing Instruments and Materials    251
Common Minor Surgical Procedures    255
General Considerations    255
Postsurgical Medications, Dressings, and Patches    255
First Surgical Experience    255
Surgical Assisting Skills    260
Aseptic Technique and Minor Surgery    260
Assisting During Surgery    263
Disposition of Instruments and Materials    264
18 REFRACTIVE SURGERY CONCEPTS AND PROCEDURES 267
History of Refractive Surgery 267
Indications and Contraindications for Refractive Surgical Procedures 268
Evaluating Refractive Surgical Patients 268
  Refraction in Myopia 268
  Refraction in Hyperopia 268
  Refraction in Astigmatism 269
  Near Refraction in Presbyopic Patients 269
Cycloplegic Refraction 269
Wavefront Analysis 269
Pupil Size Measurements 269
Ultrasound Pachymetry and Keratometry 270
Videokeratography 270
Refractive Surgical Procedures 270
  Laser In Situ Keratomileusis 270
  Photorefractive Keratectomy 271
  Laser Subepithelial Keratomileusis 271
  Epithelial Laser In Situ Keratomileusis 271
  Astigmatic Keratotomy 271
  Conductive Keratoplasty and Laser Thermokeratoplasty 273
Intrastral Corneal Ring Segments 273
  Phakic Intraocular Lenses 274
In Review 274

19 UNDERSTANDING PRACTICE MANAGEMENT 277
The Ophthalmic Practice and You 277
  For Whom Do You Work? 278
  You Are Part of a Team 278
Why Management Matters 278
  Management and the Patient 278
  Management and Your Doctor 279
  The Office Manager’s Role 280
  The Chain of Command 280
  Management of Communications 280
Management by the Numbers 280
Management Through Policies and Procedures 280
Commitments and Responsibilities 281
  Is It All About Attitude? 281
Understanding Your Commitment 281
Optimizing Your Work Time 281
Understanding Expectations 282
Additional Duties 282
  Understanding Patient Prescriptions 282
  Coordinating Patient Flow 282
  Answering the Phone 283
  Working With Non-Electronic Health Record Charts 283
  Scheduling 283
  Scribing 284
Compliance 284
Coding 285
  Coding Systems 285
  The Benefits of Proper Coding 286
  Documentation 286
  About ICD-10-CM 286
  Code Linking and Medical Necessity 286
  Coding for Ophthalmology Office Visits 287
  Eye-Visit Codes 288
  Ophthalmic Coding Specialist 288
In Review 288

20 MEDICAL ETHICS, LEGAL ISSUES, AND REGULATORY ISSUES 291
Ethics and Ophthalmic Medical Assistants 292
  Ethical Behavior 292
  Providing Technical Services 293
  Competence of Technicians 293
  Communication With Patients 293
  Informed Consent and Ophthalmic Assistants 294
Contents

Ethics and Pharmaceutical Company Representatives 295
Professional Conduct 295
  Appearance 295
  Respect and Sensitivity 296
Complementary Topics 296

21 COMMUNITY HEALTH EYE CARE 301
Definitions of Visual Impairment and Blindness 302
  Governmental Definitions of Visual Impairment and Blindness 302
  Major Causes of Reversible and Irreversible Blindness 303
  VISION 2020: The Right to Sight 303
Strategies for Improving Utilization of Eye Care 303
Local Delivery of Health Education Information 304
  Screening Programs 304
  Surgical Programs 304
Community Eye Care Programs and the Team Approach 306
Local Resources Available to Assist Visually Impaired Patients 306

22 CARE OF OPHTHALMIC LENSES AND INSTRUMENTS 309
Cleaning and Disinfection in the Presence of the Patient 310
  Care of Lenses 310
    Standard Guidelines for Care of Lenses 310
    Lenses That Do Not Contact the Eye 310
    Lenses That Contact the Eye 311
  Care of Instruments 312
    Standard Care Guidelines 313
    Keratometer 313
    Lasers 313
    Lensmeter 314
    Ophthalmoscope (Direct) 314
    Ophthalmoscope (Indirect) 315
    Phoropter 315
    Perimeters 316
    Potential Acuity Meter 317
    Projector 317
    Retinoscope 318
    Slit Lamp 318
    Tonometer (Applanation) 319
    Tonometer (Indentation) 320
    Tonometer (Tono-Pen) 321

23 ANSWERS TO CHAPTER SELF-ASSESSMENT TESTS 323
Appendix A: Glossary 337
Appendix B: Resources 361
Index 367