Record Nr. UNINA9910138987503321 Autore Kaschke Michael Titolo Optical devices in ophthalmology and optometry: technology, design principles and clinical applications / / Michael Kaschke, Karl-Heinz Donnerhacke, and Michael Stefan Rill; cover design, Simone Benjamin Weinheim, Germany:,: Wiley-VCH,, 2014 Pubbl/distr/stampa ©2014 **ISBN** 3-527-64898-4 3-527-64896-8 3-527-64899-2 9783527410682 Descrizione fisica 1 online resource (639 p.) Altri autori (Persone) DonnerhackeKarl-Heinz RillMichael Stefan **BenjaminSimone** Disciplina 617.70028 Soggetti Oftalmologia - Aparells i instruments Optometria - Aparells i instruments Ophthalmology - Equipment and supplies Optometry - Equipment and supplies Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Note generali Description based upon print version of record. Nota di bibliografia Includes bibliographical references and index. Nota di contenuto Cover; Title page; Contents; Preface; Part One; 1 Structure and Function; 1.1 Anatomy of the Human Eye; 1.2 Retina: The Optical Sensor; 1.2.1 Retinal Structure; 1.2.2 Functional Areas; 1.3 Recommended Reading; References; 2 Optics of the Human Eye; 2.1 Optical Imaging; 2.1.1 Entrance and Exit Pupils; 2.1.2 Cardinal Points; 2.1.3 Eye Axes; 2.1.4 Accommodation; 2.1.5 Resolution; 2.1.6 Adaption; 2.1.7 Stiles-Crawford Effect; 2.1.8 Depth of Field; 2.1.9 Binocular Vision; 2.1.10 Spectral Properties; 2.2 Schematic Eye Models; 2.2.1 Paraxial Model: The Gullstrand Eye; 2.2.2 Finite Wide-Angle Models 2.2.3 Applications of Eye Models 2.3 Color Vision; 2.4 Recommended

Reading; References; 3 Visual Disorders and Major Eye Diseases; 3.1 Refractive Errors; 3.1.1 Axial-Symmetric Ametropia: Myopia and

Hyperopia; 3.1.2 Astigmatism; 3.1.3 Notations of Spherocylindric Refraction in Astigmatic Eyes; 3.1.4 Anisometropia; 3.1.5 Distribution of Refractive Errors; 3.1.6 Refractive Errors Caused by Diseases; 3.2 Cataract; 3.3 Glaucoma; 3.4 Age-Related Macular Degeneration; 3.4.1 ARM; 3.4.2 Dry AMD; 3.4.3 Wet AMD; 3.5 Diabetic Retinopathy; 3.6 Retinal Vein Occlusions; 3.7 Infective Eye Diseases 3.7.1 Trachoma3.7.2 Onchocerciasis; 3.8 Major Causes for Visual Impairment; 3.9 Major Causes of Blindness; 3.10 Socio-Economic Impact of Eye Diseases; 3.11 Recommended Reading; Problems to Chapters 1-3; References; Part Two; 4 Introduction to Ophthalmic Diagnosis and Imaging; 4.1 Determination of the Eye's Refractive Status: 4.2 Visualization, Imaging, and Structural Analysis: 4.3 Determination of the Eye's Functional Status; 4.3.1 Global Functional Status: 4.3.2 Local Functional Status: 4.4 Light Hazard Protection: References: 5 Determination of the Refractive Status of the Eye 5.1 Retinoscopy 5.1.1 Illumination Beam Path; 5.1.2 Observation Beam Path; 5.1.3 Measurement Procedure; 5.1.4 Accuracy in Retinoscopy; 5.1.5 Applications: 5.2 Automated Objective Refractometers (Autorefractors); 5.2.1 Common Characteristics of Autorefractors; 5.2.2 Measuring Methods; 5.2.3 Measurement Accuracy and Limitations of Automatic Refractometers; 5.3 Aberrometers; 5.3.1 Fundamentals of Aberrometry: 5.3.2 General Measurement Principles for Aberrometers: 5.3.3 General Remarks on Aberrometry; 5.3.4 Hartmann-Shack Wavefront Aberrometer (Outgoing Light Aberrometer) 5.3.5 Ingoing Light Aberrometers 5.3.6 Commercial Aberrometers; 5.4 Wavefront Reconstruction and Wavefront Analysis; 5.4.1 From Wavefront to Refraction (Wavefront Analysis); 5.4.2 Applications of Wavefront Analysis; 5.5 Excursus: Refractive Correction with Eye Glasses and Contact Lenses; 5.6 Recommended Reading; 5.7 Problems; References; 6 Optical Visualization, Imaging, and Structural Analysis; 6.1 Medical Magnifying Systems; 6.1.1 Optics of a Single Loupe; 6.1.2 Medical Loupes; 6.2 Surgical Microscopes; 6.2.1 Requirements for Surgical Microscopes; 6.2.2 Functional Principle 6.2.3 Modular Structure of Surgical Microscopes

Sommario/riassunto

Medical technology is a fast growing field. This new title gives a comprehensive review of modern optical technologies alongside their clinical deployment. It bridges the technology and clinical domains and will be suitable in both technical and clinical environments. It introduces and develops basic physical methods (in optics, photonics, and metrology) and their applications in the design of optical systems for use in medical technology with a special focus on ophthalmology. Medical applications described in detail demonstrate the advantage of utilizing optical-photonic methods. Exercises an