

1. Record Nr.	UNINA9910299740403321
Autore	Pal Subrata
Titolo	Design of artificial human joints & organs // Subrata Pal
Pubbl/distr/stampa	New York : , : Springer, , 2014
ISBN	1-4614-6255-X
Edizione	[1st ed. 2014.]
Descrizione fisica	1 online resource (xx, 419 pages) : illustrations (some color)
Collana	Gale eBooks
Disciplina	571.4 610.28 612.75063 620
Soggetti	Biomedical engineering Artificial joints Artificial organs
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	<p>""Preface""; ""Contents""; ""Chapter 1: Overview of Human System and Its Artificial Replacement""; ""1.1 Human Body's Superficial Anatomy""; ""1.2 Human Body Features""; ""1.3 Body Size, Type, and Proportion""; ""1.4 A Brief Outline of the Organization of the Human System""; ""1.4.1 Tissue + Tissue = Organ (Different Tissues Together Form an Organ)""; ""1.4.2 Organ + Organ = Organ System""; ""1.5 Major Organ Systems""; ""1.5.1 Integumentary System""; ""1.5.2 Muscular System""; ""1.5.3 Skeletal System""; ""1.5.4 Cardiovascular System""; ""1.5.5 Respiratory System""; ""1.5.6 Urinary System""; ""1.5.7 Reproductive System""; ""1.5.7.1 Male Reproductive System""; ""1.5.7.2 Female Reproductive System""; ""1.5.8 Nervous System""; ""1.5.9 Digestive System""; ""1.5.10 Lymphatic System""; ""1.5.11 Immune System""; ""1.6 Common Names of Internal Organs (in Alphabetical Order)""; ""1.7 Brief Idea of Artificial Organs""; ""1.7.1 Different Types of Organs""; ""1.7.2 Brain""; ""1.7.3 Cardia""; ""1.7.4 Corpora Cavernosa""; ""1.7.5 Ear""; ""1.7.6 Eye""; ""1.7.7 Heart""; ""1.7.8 Limbs""; ""1.7.9 Liver""; ""1.7.10 Lungs""; ""1.7.11 Pancreas""; ""1.7.12 Bladder""; ""1.7.13 Ovaries""; ""1.7.14 Beyond Restoration""; ""1.7.15 Timeline of Successful</p>

Transplants""; ""References""; ""Exercises""; ""Chapter 2: Mechanical Properties of Biological Materials""; ""2.1 Introduction""; ""2.2 Structural Versus Material Properties""; ""2.2.1 Anisotropy and Nonhomogeneity""; ""2.2.2 Viscoelastic Properties""; ""2.2.3 Viscosity""; ""2.3 Testing Procedures""; ""2.4 Bones""; ""2.4.1 Composition""; ""2.4.2 Structure""; ""2.5 Material Properties and Related Behavior""; ""2.6 Cartilage""; ""2.6.1 Composition""; ""2.7 Material Properties and Related Behavior""; ""2.8 Ligaments""; ""2.8.1 Composition""""2.9 Material Properties and Related Behavior""; ""2.9.1 Ligaments Have Characteristics of Strain-Rate Sensitivity, Stress-Relaxation, Creep, and Hysteresis""; ""2.10 Correlation Between Structure and Function""; ""2.10.1 Ligamenta€?Bone/Tendona€?Bone Insertions""; ""Reading List""; ""Problems ""; ""Chapter 3: Basics of Design Process""; ""3.1 Introduction""; "" 3.2 Adoptive and Adaptive Design""; ""3.2.1 Introduction""; ""3.3 Introduction to Machine Design""; ""3.4 Principle of Science or Mechanism to Be Used""; "" 3.5 Safety of Products""; "" 3.6 Manufacturability""; "" 3.7 Standardization"""" 3.8 Customization""; "" For Further Details, the Following Books May Be Consulted""; "" Exercises""; ""Chapter 4: Biomaterials and Its Characterization""; ""4.1 Introduction""; ""4.2 Biomineralization""; ""4.3 Abalone Shell""; ""4.4 Self-Assembly""; ""4.5 Structural Hierarchy""; ""4.6 Applications""; ""4.7 Compatibility""; ""For Further Reading, These Papers May Be Consulted""; ""4.8 Biopolymers""; ""4.8.1 Applications""; ""4.8.2 Sources""; ""4.8.3 Applications""; ""4.8.4 Sources""; ""4.8.5 Applications""; ""4.8.6 Benefits""; ""4.9 Polymers for Healthcare""; ""4.9.1 Sterilization""

Sommario/riassunto

Design of Artificial Human Joints & Organs is intended to present the basics of the normal systems and how, due to aging, diseases or trauma, body parts may need to be replaced with manmade materials. The movement of the body generates forces in various work situations and also internally at various joints, muscles and ligaments. It is essential to figure out the forces, moments, pressure etc to design replacements that manage these stresses without breaking down. The mechanical characterization of the hard and the soft tissues are presented systematically using the principles of solid mechanics. The viscoelastic properties of the tissue will also discussed. This text covers the design science and methodology from concept to blueprint to the final component being replaced. Each chapter will be a brief overview of various joint/organ replacement systems. Engineers working on artificial joints and organs, as well as students of Mechanical Engineering and Biomedical Engineering are the main intended audience, however, the pedagogy is simple enough for those who are learning the subject for the first time.
