

# Mechanics of Biomaterials: Fundamental Principles for Implant Design (Cambridge Texts in Biomedical Engineering)

Lisa A. Pruitt, Ayyana M. Chakravartula



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Teaching mechanical and structural biomaterials concepts for successful medical implant design, this selfcontained text provides a complete grounding for students and newcomers to the field. Split into three sections: Materials, Mechanics and Case Studies, it begins with a review of sterilization, biocompatibility and foreign body response before presenting the fundamental structures of synthetic biomaterials and natural tissues. Mechanical behavior of materials is then discussed in depth, covering elastic deformation, viscoelasticity and time-dependent behavior, multiaxial loading and complex stress states, yielding and failure theories, and fracture mechanics. The final section on clinical aspects of medical devices provides crucial information on FDA regulatory issues and presents case studies in four key clinical areas: orthopedics, cardiovascular devices, dentistry and soft tissue implants. Each chapter ends with a list of topical questions, making this an ideal course textbook for senior undergraduate and graduate students, and also a self-study tool for engineers, scientists and clinicians.

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