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Nota di contenuto	Chapter 1. Introduction -- Chapter 2. Stress and Strain in Continuum -- Chapter 3. Thermodynamics -- Chapter 4. Unified Mechanics Theory -- Chapter 5. Unified Mechanics of Thermo-Mechanical Analysis -- Chapter 6. Unified Micromechanics of Particulate Composites -- chapter 7. Unified Micromechanics of Finite Deformations -- chapter 8. Unified Mechanics of Metals Under High Electrical Current Density: Electromigration and Thermomigration.
Sommario/riassunto	This text describes the mathematical formulation and proof of the unified mechanics theory (UMT) which is based on the unification of Newton’s laws and the laws of thermodynamics. It also presents formulations and experimental verifications of the theory for thermal, mechanical, electrical, corrosion, chemical and fatigue loads, and it discusses why the original universal laws of motion proposed by Isaac Newton in 1687 are incomplete. The author provides concrete examples, such as how Newton’s second law, F = ma, gives the initial acceleration of a soccer ball kicked by a player, but does not tell us how and when the ball would come to a stop. Over the course of Introduction to Unified Mechanics Theory, Dr. Basaran illustrates that Newtonian mechanics does not account for the thermodynamic changes happening in a system over its usable lifetime. And in this context, this book explains how to design a system to perform its intended functions safely over its usable life time and predicts the expected lifetime of the system without using empirical models, a

process currently done using Newtonian mechanics and empirical degradation/failure/fatigue models which are curve-fit to test data. Written as a textbook suitable for upper-level undergraduate mechanics courses, as well as first year graduate level courses, this book is the result of over 25 years of scientific activity with the contribution of dozens of scientists from around the world including USA, Russia, Ukraine, Belarus, Spain, China, India and U.K. Presents engineering mechanics through explanation of the unified mechanics theory with extensive experimental validation and finite element implementation using real world examples Draws the connections to the thermodynamics of degradation in solids from mathematical and microstructural perspective Discusses shortcomings and incompleteness of Newton’s universal laws of motion Posits why the space-time coordinate system is insufficient to describe organic and inorganic systems and modifies Newtonian space-time with introduction of an additional axis (Thermodynamic State Index axis).