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# Integrated Design of Multiscale, Multifunctional Materials and Products

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**David L. McDowell, Jitesh Panchal, Hae-Jin Choi, Carolyn Seepersad, Janet Allen, Farrokh Mistree :** **Integrated Design of Multiscale, Multifunctional Materials and Products** before purchasing it in order to gage whether or not it would be worth my time, and all praised Integrated Design of Multiscale, Multifunctional Materials and Products:

Integrated Design of Multiscale, Multifunctional Materials and Products is the first of its type to consider not only design of materials, but concurrent design of materials and products. In other words, materials are not just selected on the basis of properties, but the composition and/or microstructure iw designed to satisfy specific ranged sets of performance requirements. This book presents the motivation for pursuing concurrent design of materials and

products, thoroughly discussing the details of multiscale modeling and multilevel robust design and provides details of the design methods/strategies along with selected examples of designing material attributes for specified system performance. It is intended as a monograph to serve as a foundational reference for instructors of courses at the senior and introductory graduate level in departments of materials science and engineering, mechanical engineering, aerospace engineering and civil engineering who are interested in next generation systems-based design of materials. First of its kind to consider not only design of materials, but concurrent design of materials and products. Treatment of uncertainty via robust design of materials. Integrates the "materials by design approach" of Olson/Ques Tek LLC with the "materials selection" approach of Ashby/Granta. Distinguishes the processes of concurrent design of materials and products as an overall systems design problem from the field of multiscale modeling. Systematic mathematical algorithms and methods are introduced for robust design of materials, rather than ad hoc heuristics--it is oriented towards a true systems approach to design of materials and products.

"Mechanical and materials engineers examine systems strategies for concurrent robust design of materials and systems, along with elements of distributed modeling and simulation environments. They show how several primary disciplines or endeavors that have traditionally been distinct can combine to serve as a foundation of modern materials design. They are systems-based engineering design, computational materials science and engineering, robust system design, and information technology. Among their topics are critical path issues in materials design, decision making in engineering design, mathematical tools for decision making in design, integrated and concurrent design of materials and products, and distributed collaborative design frameworks." --Reference and Research Book News