



Engineering Mechanics and Design Applications: Transdisciplinary Engineering Fundamentals

By Atila Ertas

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In the last decade, the number of complex problems facing engineers has increased, and the technical knowledge required to address and mitigate them continues to evolve rapidly. These problems include not only the design of engineering systems with numerous components and subsystems, but also the design, redesign, and interaction of social, political, managerial, commercial, biological, medical, and other systems. These systems are likely to be dynamic and adaptive in nature. Finding creative solutions to such large-scale, unstructured problems requires activities that cut across traditional disciplinary boundaries.

Engineering Mechanics and Design Applications: Transdisciplinary Engineering Fundamentals presents basic engineering mechanics concepts in the context of the engineering design process. It provides non-mechanical engineers with the knowledge needed to understand the mechanical aspects of a project, making it easier to collaborate in transdisciplinary teams.

Combining statics, dynamics, vibrations, and strength of materials in one volume, the book offers a practical reference for engineering design. It begins with an overview of Prevention through Design (PtD), providing a broad understanding of occupational safety and health needs in the design process. It then presents condensed introductions to engineering statics, engineering dynamics, and solid mechanics as well as failure theories and dynamic loadings. Examples of real-life design analysis and applications demonstrate how transdisciplinary engineering knowledge can be applied in practice.

A concise introduction to mechanics and design, the book is suitable for nonengineering students who need to understand the fundamentals of engineering mechanics, as well as for engineering students preparing for the Fundamentals of Engineering exam. Professional engineers, researchers, and scientists in non-

mechanical engineering disciplines, particularly those collaboratively working on large-scale engineering projects, will also find this a valuable resource.

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Editorial Review

About the Author

Dr. Atila Ertas, Professor of Mechanical Engineering at Texas Tech University, Lubbock, USA, has been a driving force behind the conception and the development of the transdisciplinary model for education and research. He established The Academy for Transdisciplinary Learning and Advanced Studies (TheATLAS), the George Kozmetsky Endowment (GKE), and International Transdisciplinary Scientists' Village (Its-Village) as nonprofit organizations that encourage transdisciplinary research and educational activities. He also developed the Transdisciplinary Master of Engineering and PhD Programs on Design, Process, and Systems in conjunction with the Raytheon Company in Dallas, Texas.

Dr. Ertas is the founder and was the first co-editor-in-chief of *Transdisciplinary Journal of Integrated Design & Process Science* (JIDPS), Co-founder of the Integrated Design & Process Technology Conference (IDPT), co-founder of the ASME Engineering Systems and Design Analysis (ESDA) conference, and founding president and co-founder of the Society for Design and Process Science (SDPS). He is a Senior Research Fellow of the ICC Institute at the University of Texas Austin, a Fellow of ASME, and a Fellow of SDPS.

Dr. Ertas' contributions to teaching and research have been recognized by numerous honors and awards, including a President's Excellence in Teaching and President's Academic Achievement Award; Pi Tau Sigma Outstanding Teaching Award; George T. and Gladys Hanger Abell Faculty Award and a Halliburton Award in recognition of outstanding achievement and professionalism in education and research from Texas Tech University. Most recently, he was recognized as one of the distinguished former students of Texas A&M University's Mechanical Engineering Department. Dr. Ertas has published over 150 scientific papers that cover many engineering technical fields. He has been principal investigator or co-PI on over 50 funded research projects. Under his supervision more than 170 MS and PhD graduate students have received degrees.

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