



# Mechanical Design of Machine Components, Second Edition

By Ansel C. Ugural

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**Mechanical Design of Machine Components, Second Edition** strikes a balance between theory and application, and prepares students for more advanced study or professional practice. It outlines the basic concepts in the design and analysis of machine elements using traditional methods, based on the principles of mechanics of materials. The text combines the theory needed to gain insight into mechanics with numerical methods in design. It presents real-world engineering applications, and reveals the link between basic mechanics and the specific design of machine components and machines.

Divided into three parts, this revised text presents basic background topics, deals with failure prevention in a variety of machine elements and covers applications in design of machine components as well as entire machines. Optional sections treating special and advanced topics are also included.

Key Features of the Second Edition:

- Incorporates material that has been completely updated with new chapters, problems, practical examples and illustrations
- Places a strong emphasis is on the fundamentals of mechanics of materials as they relate to the study of machine design
- Provides thorough coverage of machine components, including their applications in modern engineering, and some discussion of entire machines
- Presents material selection charts and tables as an aid in specific applications
- Contains selective chapters that include case studies of various components and machines, as well as some open-ended problems
- Includes applied finite element analysis in design, offering an introduction to this useful tool for computer-oriented examples
- Addresses the ABET design criteria in a systematic manner
- Covers optional MATLAB solutions tied to the book and student learning

resources on the CRC website

Mechanical Design of Machine Components, Second Edition helps you gain a grasp of the fundamentals of machine design and the ability to apply these fundamentals to new engineering problems.

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Review

"Ugural has written a very good, comprehensive technical book for machine design. The book covers every fundamental of mechanical design... The author helpfully offers some case studies in which the theory is connected with and implemented in practical application..."

?*Choice, September 2015*

"... a very good, comprehensive technical book for machine design. ... will be most valuable as a text for junior and senior undergraduate courses and a reference book for mechanical engineers in practice. Summing Up: Recommended. Undergraduates through professionals and practitioners."

?X. Le, Wentworth Institute of Technology, CHOICE

"Overall, the book covers the bases. ...as complete as a machine design text can be... addressing basics, failure analysis, and a healthy variety of actual design elements and assemblages. The case studies provide particularly valuable insight into the design process as applied in the real world."

?Steven G. Hall, Associate Professor, Louisiana State University, Baton Rouge, USA

"...provides a good overview of the constituents of machine element design. The examples are interesting and illustrative."

?Andreas Almqvist, Associate Professor, Division of Machine Elements, Luleå University of Technology, Sweden

"The main strengths ... are that the book is written in an easy-to-understand English and that topics are explained rigorously. The book is well documented with references to research articles and gives good, broad but also deep insight into many subjects. ... Chapter 1 has a very good introduction to working as an engineer. The design phases are well written and understandable. ... Chapter 7.9 – 7.12 is very well written with a good introduction to using safety factors with the Goodman diagram, etc. This is not found in other books. ... [Overall,] the book covers a very broad area of mechanical engineering and still maintains good, in-depth coverage of the subjects. The book actually covers the syllabus of different courses, without the lecturer having to bring in additional reading."

?Jon Svenninggaard, VIA University College, Horsens, Denmark

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?Oussama Safadi, University of Southern California, Los Angeles, USA

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?Yong Zhu, North Carolina State University, Raleigh, USA

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?Jeff A. Hawks, Ph.D., University of Nebraska-Lincoln

"Ugural provides a comprehensive text that is well-organized and straightforward, with practical problems to reinforce the concepts."

?Dr. Todd D Coburn, PhD, PE, DER, California State Polytechnic University Pomona

#### About the Author

**Ansel C. Ugural** is a visiting professor of mechanical engineering at the New Jersey Institute of Technology, Newark, New Jersey. He has held faculty positions at Fairleigh Dickinson University, where he has served for two decades as a professor and chairman of the mechanical engineering department. Professor Ugural earned his MS in mechanical engineering and PhD in engineering mechanics from the University of Wisconsin–Madison. He is the author of several books, including *Stresses in Beams, Plates, and Shells* (CRC Press, 3rd ed., 2010). In addition, he has published numerous articles in trade and professional journals.

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