



Fundamentals of Engineering Design (2nd Edition)

By Barry Hyman

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This book provides extensive coverage of fundamental engineering design topics, embedded in a real-world context, while avoiding discipline-specific specialty topics. *Fundamentals of Engineering Design* includes extensive coverage of the steps taken when formulating design problems, global optimization, and the role of the Internet in Mechanical Engineering. A useful reference for professionals in Mechanical Engineering.

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Editorial Review

From the Back Cover

Engineering design concepts are as fundamental to undergraduate engineering education as the traditional sciences. This comprehensive text provides well-organized, flexible coverage of engineering design fundamentals including problem formulation, concept generation, project planning, engineering economics, decision making, and optimization. These topics are developed from an interdisciplinary perspective that is independent of level of technical sophistication. Thus the book can be used in design courses within any engineering discipline and at any level from first year to capstone design.

New Features:

This second edition significantly expands upon the extensive graphics, worked-out examples, and large set of exercises and design projects contained in the first edition, while retaining the informal reading style praised by students and faculty.

- Substantially expanded coverage of the professional, social, and environmental context of engineering design, including several new case studies
- More than three dozen new worked-out example problems
- Over 70 new end-of-chapter exercises
- Revised and expanded treatment of the problem formulation phase of design
- New sections on optimization software and integer programming
- Companion Website with hundreds of Microsoft PowerPoint slides and an innovative interactive Instructor's Manual containing hundreds of exercises and 50 design projects coded with respect to design and analysis skills, level of technical sophistication, and engineering discipline.

About the Author

Barry Hyman is Professor of Mechanical Engineering and Public Affairs at the University of Washington, Seattle, where he currently is Leader of the Design Faculty Group. In addition to his several decades of teaching and research on engineering design, Professor Hyman conducts research on the energy and environmental characteristics of manufacturing processes. He is Associate Editor of *Energy—The International Journal*, published by Elsevier Science.

Professor Hyman is a Fellow of the American Society of Mechanical Engineers. He received the ASME Ralph Coates Roe Medal in 2000 for his outstanding contribution toward a better public understanding and appreciation of the engineer's worth to contemporary society. He previously served ASME as Vice-President for Government Relations and Vice-President for the Northwest International Region. His other awards include the ASEE Centennial Medallion for significant and lasting contributions to engineering education and the ASEE Chester F. Carlson Award for Innovation in Engineering Education. In 1995 the Puget Sound Engineers Council named him Academic Engineer of the Year.

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The basic structure of this book is unchanged from the first edition, but much of the existing material has

been enhanced and new material has been added. Chapters 2, 3, and 10 have undergone the biggest changes. I have reorganized Chapter 2 to clarify the steps in formulating design problems. Much of the material in Chapter 3 has been updated to reflect the rapidly increasing role that the Internet has assumed as a source of technical information. In Chapter 10, the treatment of global optimization has been rewritten and new sections have been added on optimization software and on integer programming.

In keeping with the ABET mandate for integrating social and professional issues into engineering design education, I have added a new section on life-cycle assessment to Chapter 1 and expanded Section 4.2 on the role of engineers in society and Section 4.9 on engineering-government interaction. In addition, detailed case studies of engineering ethics and professional liability have been added to Chapter 4. Further, I have included extended vignettes on the social and environmental context of specific design problems in Chapters 7, 8, 9, and 10.

In response to comments from students and reviewers, I have added several worked-out example problems to every chapter. And in keeping both with ABET's increased emphasis on multidisciplinary work and the original intent of the book (see Preface to the First Edition, p. xi), I selected these example problems to provide a more balanced treatment of design concepts across all engineering disciplines.

Most of the graphics have been redone to provide a more consistent professional style to line drawings throughout the book. Also, I have inserted dozens of additional line drawings and photographs to better illustrate concepts discussed in the narrative and to break up long stretches of text. In addition, I have added over 70 new end-of-chapter exercises.

A Web site (www.prenhall.com/hyman) has been established for this edition. The site contains hundreds of PowerPoint® slides that can be downloaded, including a slide for every figure and table in the book, plus key discussion topics in outline form.

For those faculty that use Mathcad®, a Mathcad Electronic Book can also be accessed from the Web site. This is an expanded, hyperlinked, and interactive version of the Solutions Manual, including all of the PowerPoint files and a set of 50 design projects. It also contains many more exercises than appear in this book; and when instructors change the values of numerical parameters that are part of the problem statement, Mathcad automatically regenerates the solutions. All solutions reside in a password-protected hidden region of each exercise file, so instructors can give students access to the exercises with or without the solutions. Every design-project file is similarly interactive and has a detailed "solution" contained in a password-protected hidden region. All exercises, PowerPoint slides, and projects can be reached by hyperlinks in the Electronic Book's Table of Contents. All exercises and projects are coded with respect to engineering discipline, level of technical sophistication, and design topic.

Many students and colleagues pointed out errors in the first edition. Despite my best efforts to eliminate all errors before the book went into production, I assume there will be some errors also detected in the second edition. As they are discovered, they will be posted in an Errata Sheet that will be maintained on the book's Web site.

I appreciate the feedback I have received from many users and reviewers of the first edition. Their comments have been extremely valuable in developing the revisions included in this edition. In particular, I'd like to thank Professors Gary Bernstein, Notre Dame University; Richard Skovholt, EmbryRiddle Aeronautical University; Michael Wells, Montana State University; Robert Jordan and David Hutchins, Cogswell College; Joyce Cooper, Mark Ganter and Vipin Kumar, University of Washington; Ajay Pandey, Barkatulla University; and five anonymous reviewers. Numerous students have also provided constructive criticism and I greatly appreciate their insights. Mr. Jun Liu served as a teaching assistant for me for several offerings of a

course using this book. During that time, one of his major contributions was to develop a new set of design projects that are now included in the Mathcad Electronic Book associated with this edition. In addition, I wish to gratefully acknowledge the work done by my students that appears in Figures 1-16, 1-18, 1-19, 1-20, and 6-19. And finally, I am indebted to Ms. Laura Fischer, my Prentice Hall Acquisitions Editor, and Rose Kernan, Production editor, for their patience, understanding, and guidance in bringing this project to fruition.

BARRY HYMAN

Users Review

From reader reviews:

Sun Byrd:

People live in this new moment of lifestyle always make an effort to and must have the free time or they will get wide range of stress from both day to day life and work. So , when we ask do people have extra time, we will say absolutely without a doubt. People is human not just a robot. Then we ask again, what kind of activity do you possess when the spare time coming to you of course your answer will certainly unlimited right. Then do you ever try this one, reading books. It can be your alternative in spending your spare time, the book you have read is usually Fundamentals of Engineering Design (2nd Edition).

Andrew Martin:

Playing with family in a very park, coming to see the marine world or hanging out with friends is thing that usually you might have done when you have spare time, after that why you don't try factor that really opposite from that. Just one activity that make you not feeling tired but still relaxing, trilling like on roller coaster you are ride on and with addition of information. Even you love Fundamentals of Engineering Design (2nd Edition), you are able to enjoy both. It is very good combination right, you still would like to miss it? What kind of hangout type is it? Oh occur its mind hangout people. What? Still don't buy it, oh come on its identified as reading friends.

Gale Gibbs:

This Fundamentals of Engineering Design (2nd Edition) is great book for you because the content that is full of information for you who else always deal with world and possess to make decision every minute. This specific book reveal it information accurately using great manage word or we can say no rambling sentences within it. So if you are read the idea hurriedly you can have whole facts in it. Doesn't mean it only provides straight forward sentences but tricky core information with attractive delivering sentences. Having Fundamentals of Engineering Design (2nd Edition) in your hand like getting the world in your arm, information in it is not ridiculous 1. We can say that no book that offer you world throughout ten or fifteen tiny right but this reserve already do that. So , this is good reading book. Hey Mr. and Mrs. stressful do you still doubt this?

Richard Pascual:

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