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Engineering Design Methods: Strategies For Product Design



Synopsis

Written in a clear and readable style by an experienced author of teaching texts, *Engineering Design Methods* is an integrated design textbook that presents specific methods within an overall strategy from concept to detail design. It also outlines the nature of design thinking, and sets it within broader contexts of product development and design process management. The book is much more than a manual of procedures; throughout, there is discussion and explication of the principles and practice of design. Building on the outstanding success of the previous three editions, this new edition cements the position of *Engineering Design Methods* at the forefront of engineering and industrial design as an essential text not only for students and lecturers but also for practitioners. The book promotes a flexible approach to the design process, and provides explicit, step-by-step advice on how to implement several separate design methods that have been shown to be of value in both education and practice. This revised fourth edition - promotes a flexible approach to the design process, provides explicit, step-by-step advice on how to implement several separate design methods that have been shown to be of value in both education and practice, contains new case studies and examples from industry that further broaden the scope of the book from engineering design into product design, includes a significant new chapter presenting user scenarios; a procedure for investigating potential product user wants and needs, that culminates in a design brief identifying an opportunity for developing a new product concept, features a book companion website with powerpoint slides for instructors.

Reviewers' comments:

"*Engineering Design Methods* is a valuable contribution to the engineering design literature. The engineering design methods presented are those that are of practical significance and the book is a must for anyone wishing to raise the standard of their design work. The design methods are described clearly and succinctly, examples are used to illustrate principles and design strategies are presented that show how the methods are best employed". Professor Graham Thompson, Department of Mechanical Engineering, UMIST, UK

"Professor Nigel Cross' treatment of Engineering Design is a singularly successful treatment for my courses because it is short and concise enough to be read by virtually all students. Furthermore, his interpretations are open enough to allow the inquiring mind to fill out the picture, incorporating and extending the ideas to fit the reflective designer's own needs". Professor Larry Leifer, Stanford Center for Design Research, Stanford University, USA

"This book is an excellent book as a textbook for design methodology both for undergraduate and graduate level. Students will gain a firm foundation of design methods from problem definition to design evaluations from this book". Professor Kun-Pyo Lee, Department of Industrial

Design, Korea Institute of Science and Technology, Korea

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Customer Reviews

This latest edition of Engineering Design Methods maintains the excellent standard set by its predecessors and is a valuable contribution to the engineering design literature. It is a useful text for both engineering students and practising designers. The engineering design methods presented are those that are of practical significance and the book is a must for anyone wishing to raise the standard of their design work. The design methods are described clearly and succinctly, examples are used to illustrate principles and design strategies are presented that show how the methods are best employed.

•Dr Graham Thompson, Dept. of Mechanical Engineering, UMIST, Manchester, UK

Professor Nigel Cross's treatment of Engineering Design is a singularly successful treatment for my courses because it is short and concise enough to be read by virtually all students. Furthermore, his interpretations are open enough to allow the inquiring mind to fill out the picture, incorporating and extending the ideas to fit the reflective designer's own needs. More prescriptive treatments fail to support learning in this regard.

•Professor Larry Leifer, Stanford Center for Design Research, Stanford University, USA

This book is an excellent book as a textbook for design methodology both for undergraduate and graduate level. It includes all the necessary issues of design methods ranging from comprehensive theoretical frameworks on design and the design process to very practical examples. Students will gain a firm foundation of design methods from problem definition to design evaluations from this book.

•Professor Kun-Pyo Lee, Dept. of

Industrial Design, Korea Advanced Institute of Science and Technology, Korea --This text refers to an out of print or unavailable edition of this title.

This book is also available through the Introductory Engineering Custom Publishing System. If you are interested in creating a course-pack that includes chapters from this book, you can get further information by calling 212-850-6272 or sending email inquiries to engineerjwiley.com. Concentrates on basic approaches to design for a wide range of engineering products emphasizing problem formulation, conceptual and embodiment design as well as a mix of creative and systematic techniques which together can be used to resolve product design problems. Completely updated and revised this edition contains a new chapter on design for quality and numerous new examples. --This text refers to an out of print or unavailable edition of this title.

Good for design researchers and practioners.

I bought this book for an introductory engineering class and only opened it when I needed buzz phrases from it. All the useful information was covered easily in class by the professor (who was a graduate student who had no desire to teach at all.) The ideas in the book only warrant a few pages to be fully explained. The book is very thin and most of its content is examples to illustrate the use of techniques it teaches. The examples have lots of unnecessary detail, which seem only to serve to thicken the book. You will either loathe needing to read through these or develop a habit of only reading the beginning pages of a chapter when studying. If you are looking into buying this book chances are it is for a class. There are no problems in the book to be worked out (which would be much better practice than these examples.) If you expect to be quizzed over the book, you can probably fake it if your professor also discusses the ideas in class, if not I sympathize with you and hope you try to persuade your school to drop this book from the curriculum.

I have made this the main text for a mechanical systems subject that I lecture. The reason for this is that it has a good collection of tools that engineers would want to be familiar with, it has good introductory chapters on the nature of design (they explain the diverse nature of design, and do not push a simple single approach, like some engineering design texts), it explains design within the context of broader development, and it is a reasonable price. I think this is what makes it the best choice for students: it's a good balanced coverage and you know they will buy it. I am familiar with other works by Nigel Cross, and think very highly of the research and writing that he has done. I

have also corresponded with regarding research into design. Even though he is not qualified as an engineer, I have found his understanding of engineering design to be insightful and helpful. The reason I say this? I am clearly biased in writing this review, and I should make that clear. Although, I think it is the best book out there on the topic when all things are considered, I did need to look elsewhere when I wanted to teach design for X and concurrent engineering. Nigel Cross has also written some excellent stuff on design cognition that I take from his other book 'Designerly ways of knowing' and would like to see in this book. Finally, although I talk about it from the perspective of a lecturer, I do think it is a good reference for a practising engineer. The tools are covered in enough details to decide if they are right for what you want to do. Also, the preliminary chapters on what design is, what makes a good designer and design strategy are good to review on occasion. They will make you think about if you have become stuck in your ways of working as an engineer, and might need to approach things differently. In summary - it lacks some things I would like, but it is the best compromise when it comes to engineering design texts for students or professionals.

The author, Prof. Nigel Cross (The Open University, Milton Keynes, United Kingdom) offers by this book a strategic approach and a number of tactics as aids for designing successful products. It is intended primarily for use by students and teachers of engineering design and industrial design. Its main emphasis is on the design of products that have an engineering content, although most of the principles and approaches that it teaches are relevant to the design of all kinds of products. It is essentially concerned with the problem formulation and the conceptional and embodiment stages of design, rather than the detail design which is the concern of most engineering texts. This book can most effectively be used in conjunction with projects and exercises that require the exploration and clarification of design problems and the generation and evaluation of design solutions. The author offers several interesting and useful methods that are structured in clear charts and diagrams that are easy to survey. Especially the evaluation methods are very interesting: According to my knowledge Nigel Cross is the only author of a book of design who describes e.g. the Morphological Chart Method. Cross does not present his methods in abstraction, but shows also the practical application by examples everybody can understand. Unfortunately, there are not many pictures or photos and colour is also a missing thing in this book. And the rare pictures you can find in this book seem to be a product of the period between 1970 and 1980, although this book was first published in 2000. Building on the world-wide success of the previous editions, this new edition reinforces its original three-part structure. It is divided in the following chapters or headlines: Part One: Understanding Design (1. The Nature of Design; 2. Design Ability; 3. The Design Process); Part

Two: Doing Design (4. New Design Procedures; 5. Clarifying Objectives; 6. Establishing Functions; 7. Setting Requirements; 8. Determining Characteristics; 9. Generating Alternatives; 10. Evaluating Alternatives; 11. Improving Details) and Part Three: Managing Design (12. Design Strategies; 13. Product Development). In my opinion this book is not only very useful for students or lectures but also for practitioners. - Dipl.-Ing., Dipl.-GwL., StR. Christoph Erlemeier, Stuttgart, Germany -

Nigel Cross framed the world's dialogue about "design thinking" with his 2006 book *Designerly Ways of Knowing*. His updated edition of *Engineering Design Methods* is a wonderful quick reference of common product design methods, described by design phase. This is no easy task because designers are notorious about using themselves to prototype new processes and models, so any book will be challenged to document a general shared set of methods for the product design community. For those interested in learning more, another resource is Hugh Dubberly's *How Do You Design?*, which is still a work of progress years later.

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