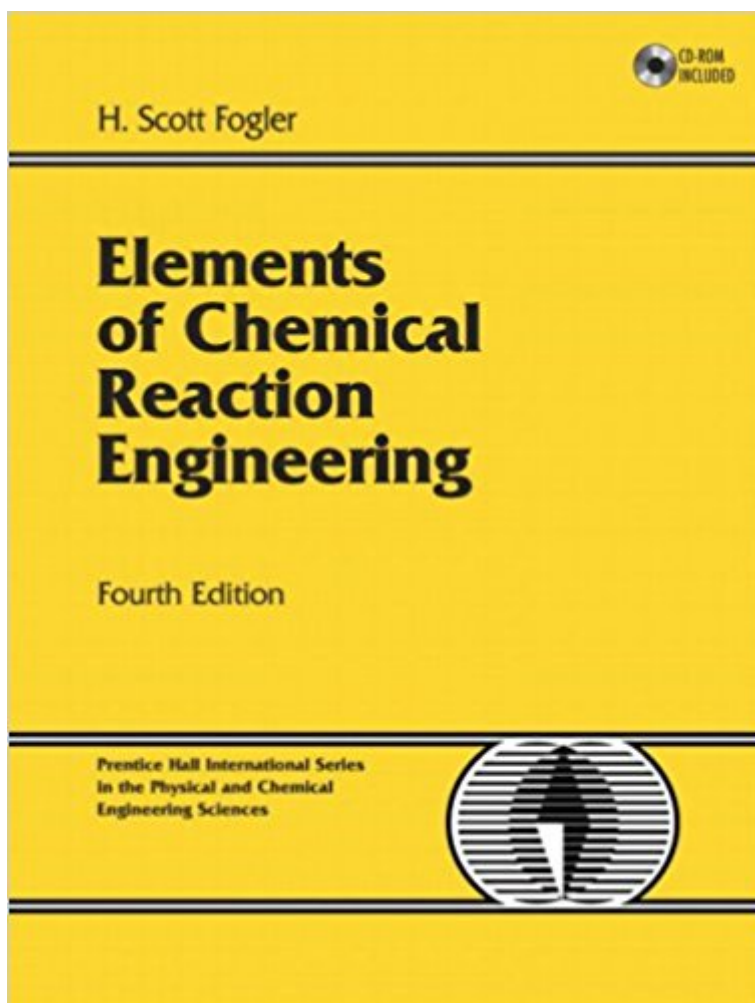




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# Elements Of Chemical Reaction Engineering (4th Edition)



## Synopsis

The Definitive, Fully Updated Guide to Solving Real-World Chemical Reaction Engineering Problems

The fourth edition of *Elements of Chemical Reaction Engineering* is a completely revised version of the worldwide best-selling book. It combines authoritative coverage of the principles of chemical reaction engineering with an unsurpassed focus on critical thinking and creative problem solving, employing open-ended questions and stressing the Socratic method. Clear and superbly organized, it integrates text, visuals, and computer simulations to help readers solve even the most challenging problems through reasoning, rather than by memorizing equations. Thorough coverage of the fundamentals of chemical reaction engineering forms the backbone of this trusted text. To enhance the transfer of core skills to real-life settings, three styles of problems are included for each subject: Straightforward problems that reinforce the material; Problems that allow students to explore the issues and look for optimum solutions; Open-ended problems that encourage students to practice creative problem-solving skills.

H. Scott Fogler has updated his classic text to provide even more coverage of bioreactions, industrial chemistry with real reactors and reactions, and an even broader range of applications, along with the newest digital techniques, such as FEMLAB. The fourth edition of *Elements of Chemical Reaction Engineering* contains wide-ranging examples—from smog to blood clotting, ethylene oxide production to tissue engineering, antifreeze to cobra bites, and computer chip manufacturing to chemical plant safety.

About the CD-ROM

The CD-ROM offers numerous enrichment opportunities for both students and instructors, including the following Learning Resources:

- Summary Notes: Chapter-specific interactive material to address the different learning styles in the Felder/Solomon learning-style index
- Learning Resources: Web modules, reactor lab modules, interactive computer modules, solved problems, and problem-solving heuristics
- Living Example Problems: More than fifty-five interactive simulations in POLYMATH software, which allow students to explore the examples and ask “what-if” questions
- Professional Reference Shelf: Advanced content, ranging from collision and transition state theory to aerosol reactors, DFT, runaway reactions, and pharmacokinetics
- Additional Study Materials: Extra homework problems, course syllabi, and Web links to related material
- Latest Software to Solve “Digital Age” Problems: FEMLAB to solve PDEs for the axial and radial concentration and temperature profiles, and Polymath to do regression, solve nonlinear equations, and solve single and coupled ODEs

Throughout the book, icons help readers link concepts and procedures to the material on the CD-ROM for fully integrated learning and reference.

## Book Information

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## Customer Reviews

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H. Scott Fogler is the Arthur F. Thurnau Professor, Vennema Professor of Chemical Engineering at the University of Michigan. His research interests include flow and reaction in porous media, fused chemical relations, gelation kinetics, and chemical reaction engineering problems in the petroleum industry. He has graduated 37 Ph.D. students and has more than 200 refereed publications in these areas. Fogler is the AIChE 2008 President-elect. He has chaired ASCE Chemical Engineering Division, served as director of the American Institute of Chemical Engineers, earned the Warren K. Lewis Award from AIChE for contributions to chemical engineering education, and received the Chemical Manufacturers Association’s National Catalyst Award. He is the co-author of the bestselling textbook *Strategies for Creative Problem Solving*, Second Edition (Prentice Hall, 2008).

*Elements of Chemical Reaction Engineering* was the textbook that my university used to teach their ~3rd year student chemical engineering class on chemical reaction engineering. It was in this class that we learned about Batch Reactors, Continuous Stir Tank Reactors (CSTR), Plug Flow Reactors (PFR), and Packed Bed Reactors. Each one of these different reactors has its own unique design equations and mathematics. We also learned about the mass transport principals for catalyst media, reaction rate constants, and how they are adjusted for varying temperatures. All of these topics are well covered in this book. There are 3 or 4 well known textbooks that cover this topic, this one seems to be about the most popular, and it is popularly used for undergraduate coursework. I also used it some to support understanding of more advanced reactor design concepts when I was taking graduate level chemical engineering courses, so the basics (and not so basics) covered in

this textbook are useful for supporting more advanced work too. Some of the more advanced chemical reaction engineering textbooks just do not do as good of a job of explaining reactor design equations as this one does. There is a very large amount of material covered in this book, if you use it for an undergraduate course textbook, you won't be able to read and learn about all of it, but this makes it useful for being a good reference textbook later. The book explains how to do mole balances, reaction rate equations and measurements, reactor sizing and networking, stoichiometry, yields, energy balances for chemical reactors, handling of multiple reactions, biochemical reaction rate equations, the mass transport principals behind use of catalysts (there are a lot of mass transport things going on here), and some things about mixing and non-ideal reactors and use of tracers. These are all important concepts in the field of chemical engineering, and make this a good textbook for coursework, and for reference. I've seen reviews for this textbook claiming that the writing is bad and the figures aren't very good. This is true, and this is why I'm giving this book four stars instead of five. This textbook has a lot of grayscale graphics throughout. Some of them are high quality, while others are grainy and the resolution sucks. Fortunately, the graphics that are most important (the graphs and plots) are of high quality, and the lower quality things are generally less important. The editing of this textbook is also somewhat modest, especially considering that it is a fourth edition, and that the copy that I have isn't the first printing of the fourth edition either. There are grammatical errors occasionally, but fortunately, they don't greatly interfere with the understanding. Probably the worst editing shortfall is that the homework problems aren't always written all that well. Some are randomly super difficult for an undergraduate to solve with normal undergraduate math skills, perhaps because they made a mistake in writing the question. Some of them provide data that you are supposed to come up with a graph and regression with, and they give you so few data that you can hardly do it. There are also questions that are just poorly worded. One asks you to specify the \*weight\* of catalyst required for the reactor, when they really should have been saying mass, since weight is gravity dependent. My classmates and I thought about just skipping the calculations and answering "None, because it's in space!!" This textbook is also quirky. There is a homework problem on it about a Hippopotamus where a veterinarian does surgery on it, and accidentally switches the stomach and intestine, and you have to use CSTR and PRF calculations to see if the Hippo would survive or not. There is also a homework problem about a small swimming organism where they give the journal article where the data came from, and if you look it up, the swimming organism is a sperm cell!! You will find other quirky homework problems, this is just the beginning. This book also comes with a small software program called Polymath. This problem is useful for solving chemical reaction differential equations, and is much easier to use and

easier to learn than the heavyweight softwares like Matlab for example. Try it out if you have trouble solving differential equations for chemical reactors. Another nice advantage of this book is that it has nice coverage on graphical solutions for reactor design. While at times this seems archaic because we have so much computing power with computers now that we can always solve analytically or via a diff equ solver, the graphical solutions provide a second way of trying to grasp the reactor design concepts, and some readers will really do well in using graphical solutions to help them understand the overall design concepts. So...in summary, from a technical standpoint, this is a very good book, but it could be written and edited a little better. Try not to let the editing get on your nerves too much, focus on the equations, and you will probably be ok. I can't think of another reactor design textbook that is necessarily better than this one.

This post is regarding the 5th Ed. (2016). I bought it at the start of the semester because my reactor design professor asked specifically for this new edition, even though he hadn't received his own copy of the book. When we started using it, it turns out that some chapters that were present in the 4th edition were ditched and some, which we consider a bit unnecessary, were added. However, what I believe hurts this new edition the most, is that it has less than half of the exercise problems that previous editions had. The worst part is that it still has those exercises that say things like "Go home and rest"!!! As for content, the book is good, but I would encourage other students to find a copy of the 4th edition if you actually want practice problems for your tests. Best of luck to all ChE students out there.

Better than expected in terms of both quality and content. Book shipped internationally pretty quickly (took total of 5 days). The book itself is one of the best that I have read. The examples shown and the sequence of thought that I had to follow as a student. Definitely worth its price.

Everything ok

Get the US HC edition. The cheap one has horrible transparent paper and it appears the font is either thicker or spaced closer together. The problems are written to cause you to constantly flip back and forth as they "refer to the data in.." or "figure n". I could go on but I'll just say that I'm getting rid of this and I bought Levenspiel and C&R v3.

If you are using this book for a class that the prof. assigns homework problems from, be forewarned

that some of them were changed between the 3rd and 4th editions, and that the international edition is different from the US version. Stupid publishers. As other reviews have mentioned, there are a few typos &etc. thrown around too, just for fun. As far as math goes, for some of the problems you'd better have passed differential equations. But the author has a sense of humor and explains the concepts well. The book is useful and practical. The summaries at the end of the chapters are great, and the progression of material is fairly logical.

The style in which this book is laid out truly works to promote the reader to learn and understand the topic. I wish more books would take the time to convey their messages in the way this text does. That being said, this is a beastly read. I doubt I'll ever use it for much more than a reference, but for that its pretty sweet.

Book arrived earlier than expected. Great price, the version I received was a black cover international. Is exactly the version I'm using in class.

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