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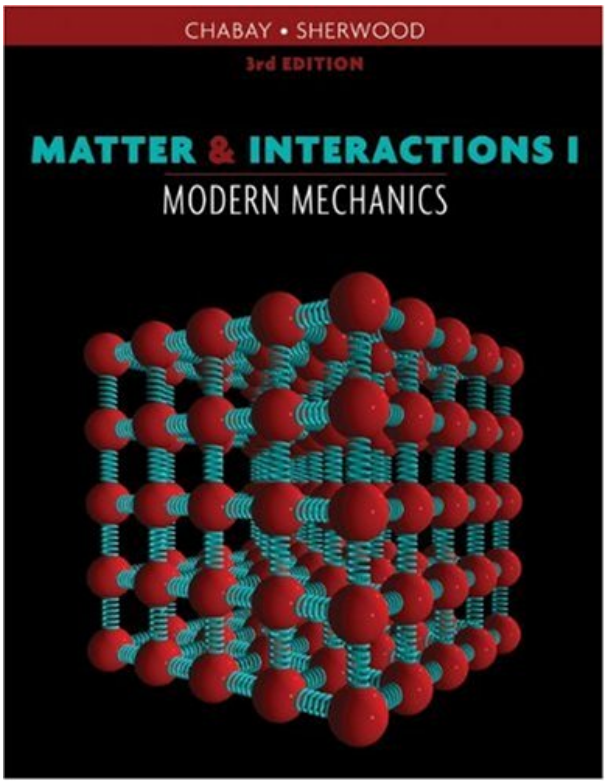

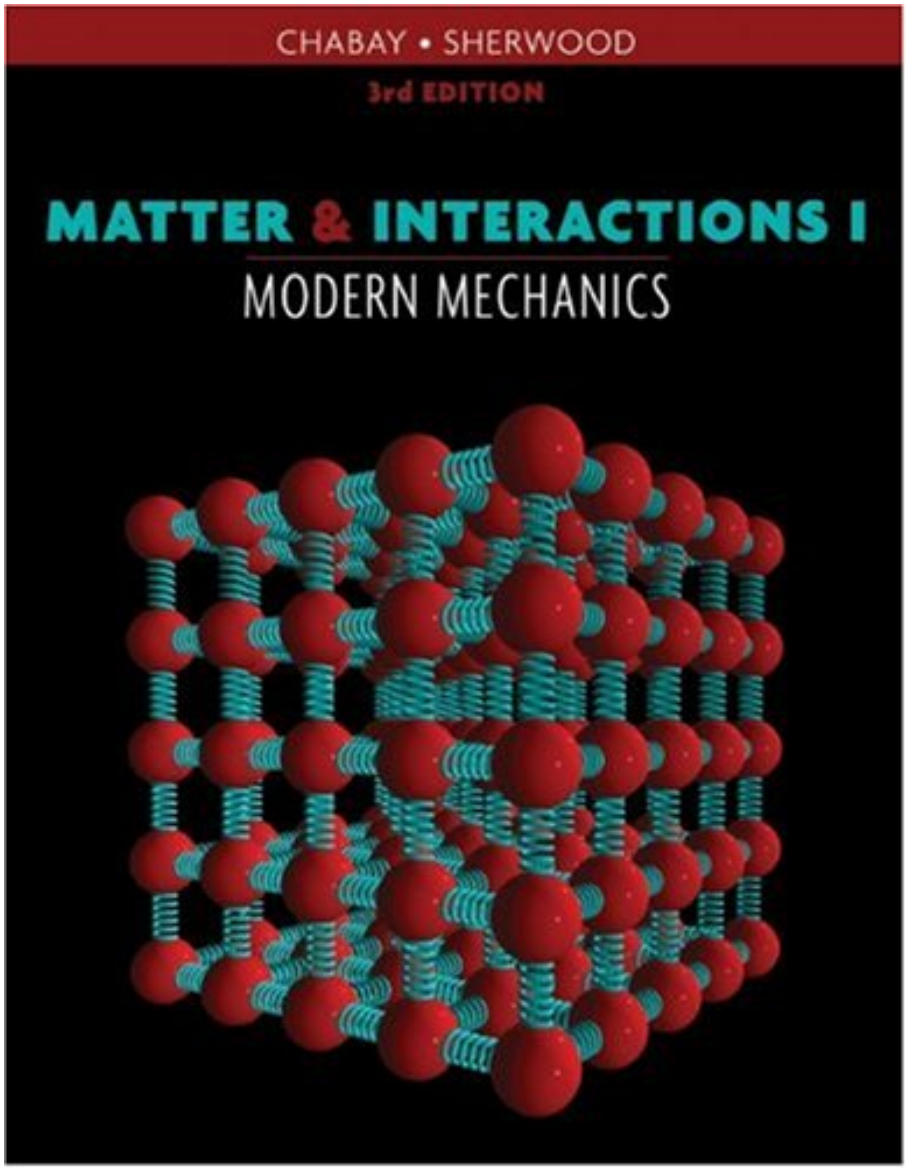

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The third edition provides practicing physicists with the fundamental principles that underlie the behavior of matter while presenting a modern integration of 20th Century physics. Emphasis is placed on constructing and using physical models. Serious computer modeling is introduced in the beginning to help build a strong foundation on the use of this important tool. End-of-chapter problems delve into experiments using simple equipment to gain insight into deep scientific issues. Stop and Think questions are also included to engage physicists in the material.

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- 600 pages

Most helpful customer reviews

13 of 13 people found the following review helpful.
Terrible Textbook
By Physgradstudent
First some background: as my username suggests, I am a graduate student in physics. I am a TA for a course that uses this as a textbook. The following review is mostly intended for professors who are thinking about using this as a course textbook.

I have nothing complimentary whatsoever to write about the textbook. In what follows, I will try to keep the language civil and the invective to a minimum, so that professors thinking about using this for their course will take this review seriously. Given the book, however, that is a difficult proposition.

In my opinion, the worst thing about the book is its emphasis on words rather than mathematics. Ever since Newton's days, people have realized that it is far more effective to teach physics using mathematical equations than to teach it using vaguely defined words that leave the interpretation open to the reader. For some reason, the authors have decided that it is time to undo four hundred years of progress in pedagogy. Most explanations are too long-winded and not at all clear on what the underlying assumptions in the explanation are. After reading anything from most of the textbook, students get a vague feeling that they have understood what is mentioned, but probing them just a little further reveals the inadequacies of this approach. In my opinion, the false feeling of having understood something is more dangerous than not having understood it at all. Closely related to this point is the fact that the book uses almost no calculus at all: no Taylor series, almost no integration or differentiation. They briefly mention it as an inessential afterthought, whereas it really is the heart of the matter. For instance, they universally use the form F=delta

P/delta t rather than F = dP/dt. They have arguments, again without actually using mathematics, that inform the students that if the time step is not infinitesimally small, then they should actually be using the average force, but this average is only very vaguely defined. "How large can delta t be?" is a question that is again answered through words, meaning that students using this book will only be able to find out if their chosen value of delta t is too large using trial and error.

The book introduces a rather inconvenient formalism for solving problems and tries to stick by it. Undoubtedly the authors felt that a general formalism would help students to solve a large number of problems using the same equations. While this is a noble goal, the formalism is extremely clunky and, because of the aforementioned lack of calculus, is applicable in only extremely artificial problems. So most problems given in the book reek of artificiality, and you are left asking: "How could one meaningfully measure the quantities given as known in the problem? And what on earth could anyone do with the answer to that question?"

The book tries to introduce special relativity, but the authors do a very bad job indeed. It is difficult to believe that the authors try to introduce special relativity without first properly defining what a frame of reference is. No time dilation, no length contraction; they use the relativistic equation for momentum (p = gamma m v) without any background or explanation as to what the v in the Lorentz factor really is. All students learn is an equation. They do not understand (and the textbook does not mention it) that this equation is useless except as a piece of trivia, because they cannot actually substitute it in F=delta P over delta t.

The book also tries to introduce quantum mechanics. As you would've guessed from the above, they try to do it without using calculus and obviously make a mess. The only knowledge about about quantum mechanics that the students get from reading the book is the wrong impression that energies are necessarily discrete in quantum systems. No Schroedinger equation. Heisenberg's uncertainty relation is introduced without explaining what uncertainty means.

The book does a relatively OK-ish job of introducing entropy and the kinetic theory of gases, but by this point the students are so mathematically illiterate anyway in the rest of the physics that they do not grasp the utility of doing things this way.

In order to make up for the shortfall of not actually teaching the students to solve equations, the book also tries to get them to instruct computers to solve the problem for them. It uses a python library called VPython. The library is neat and all, but the most important things about the physics section of the code: "What delta t should one choose?" "Where is the physics here?" "What initial conditions are necessary for a complete solution?" are all left unanswered or badly answered.

Please, for the sake of your students, do NOT use this book. Halliday and Resnick is orders of magnitude better.

The one silver lining through an extremely dark cloud is that, as far as I know, solutions to the problems are not available online, so students can't copy down the answers for their homework.

15 of 16 people found the following review helpful.
Not everyone's cup of tea
By Revanchist
If you are looking for a standard text on Mechanics, books such as Marion & Thornton or the redoubtable Goldstein are better bets. But, when teaching at an introductory level, it is absolutely vital that the physical

principles be emphasised over carrying out calculations. Laying down a strong foundation is a must in any field and it's no different in Physics. What Chabay & Sherwood try to achieve is to present Mechanics, a well understood subject, in a different light. And they succeed very well. Some of the salient features of this book are:
1) The presentation of the conservation principles is completely spot on. The momentum principle, angular momentum and energy conservation are discussed in great detail.
2) The discussion of multi-particle systems is one of the highlights of the book. The book offers two routes of analysing such systems: from "point-particle" and "real" perspectives. The terms such as center of mass, the relevant energy and momentum terms, etc are all presented with good clarity.
3) And the most unique feature of the book is the way it incorporates special relativity into the syllabus and treats Newtonian mechanics as the low-speed limit. And it also has several other unorthodox topics. Contact interactions are discussed in detail and so is the concept of internal energy. There is also a small amount of quantum mechanics present in the book in the chapter Energy Quantization. The last two chapters also discuss some elementary thermodynamics such as gases and engines. The chapter on entropy is very well done and would not be out of place in a higher level text.
Thus, there are many good features of this book. But, the ability to perform calculations is a necessity in most fields. The book is not completely rigorous in its treatment of certain topics and one does get the feeling that a couple of topics could have been sacrificed for more depth. Nonetheless, an excellent attempt to present Mechanics in a new light at the introductory level. I'd give it 4.5 stars on 5.

2 of 2 people found the following review helpful.
Okay, not too fantastic though
By Helen
It's much better than the Vol2 one. Gives examples and equations needed to do well in exams. However, there aren't any solutions for the questions at the back of each chapter which is a pity because some questions are quite challenging

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