A user-friendly text with the core ingredients

Physics
The First Science

Peter Lindenfeld and
Suzanne White Brahmia
Rutgers U. Press, Piscataway, NJ, 2011.
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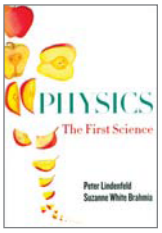
Reviewed by Shaukat Goderya

Anyone who is teaching algebra-based physics should consider the textbook Physics: The First Science. I am, and I intend to use it in my college physics classes in the spring of 2013.

Armed with their strong teaching experience, Rutgers University professors Peter Lindenfeld and Suzanne White Brahmia have written a highly recommended text that is terse and concise, yet informative and complete. Physics: The First Science has an entirely different style and completely different content selection from popular textbooks available on the market. The easy-to-read, double-column format works well to connect the topics within each chapter.



The subject progression from chapter to chapter is logical and builds a continuous and well-integrated story. Diagrams and figures are simple, both from the instructor's perspective for use in class lectures and from the student's for assistance in understanding the problem. There are no colored diagrams, which in my opinion are unnecessary for learning physics; after all, students do not often use color when solving problems.

In the first 13 chapters (of 15, plus a quick wrap-up), the authors discuss the fundamental forces of nature and all the core topics in classical mechanics, electricity and magnetism, nuclear physics, and quantum physics. If you are required to assess your algebra-based physics classes, as I must for the Southern Association of Colleges and Schools, then you will love chapter 14, "Energy in Civilization," and chapter 15, "Atomic Physics Pays Off: Solar Cells, Transistors, and the Silicon Age." They are timely additions that show how physics influences society and our daily life—making such a connection is a criterion for accreditation-agency assessments.

In my many years of teaching physics I have found that a majority of students just don't read bulky textbooks. This roughly 350-page text is structured for a two-semester college physics course and is an easy read. Instructors will have no problem covering half of the text in each semester. Most currently popular textbooks have nearly 1000 pages and 30 chapters to be covered in a two-semester course. Even the most experienced instructors have difficulty covering 15 chapters in 15 weeks. This textbook's compact presentation helps solve that problem; moreover it is structured to allow for flexibility in course design. For example, the essential topics in fluid, heat, and thermodynamics are all covered in chapter 7. Coverage of the second law of thermodynamics and entropy is found in chapter 14, where it could be saved for the second semester or assigned as additional first-semester reading material.

The majority of the text requires only background knowledge of high-school algebra. Derivatives and integrals are used to make connections with slopes and areas where appropriate in the text, but are never required in problem solving.

A unique feature of the book is its guided review questions. Because they are linked to the worked examples, they force the student to concentrate on learning the concepts. Many of those examples and questions require the student to work with the interactive simulations developed by PhET at the University of Colorado, Boulder (http:/phet.colorado.edu). The PhET simulations are an excellent resource to engage high school and college students in active learning. The website is user friendly, and today's computer-savvy students will have no problem using the simulations. The website is accessible for free, which makes this textbook more economical than some others that charge for access to supplementary Web assignments.

For all its strengths, Physics: The First Science has a few drawbacks that instructors should consider. Although there are plenty of problems to choose for homework assignments, the difficulty level of each problem is not stated. And although the solutions to some problems can be found at the book's website (http://rutgerspress.rutgers.edu/physics.html), it is not clear whether any ancillary materials—test banks, solution manuals, online problem banks, and so on—are available for the instructor. And unlike other popular algebra-based physics texts, this one does not include helpful discussions on problem-solving techniques and strategies for the concise worked examples. I hope the next edition will offer more symbolic problems, as they are important in illustrating how to develop mathematical relationships between known physical variables and unknown quantities.

Shaukat Goderya is an associate professor of engineering and physics and director of the program for astronomy education and research at Tarleton State University in Stephenville, Texas. He has taught algebra-based physics for more than two decades.