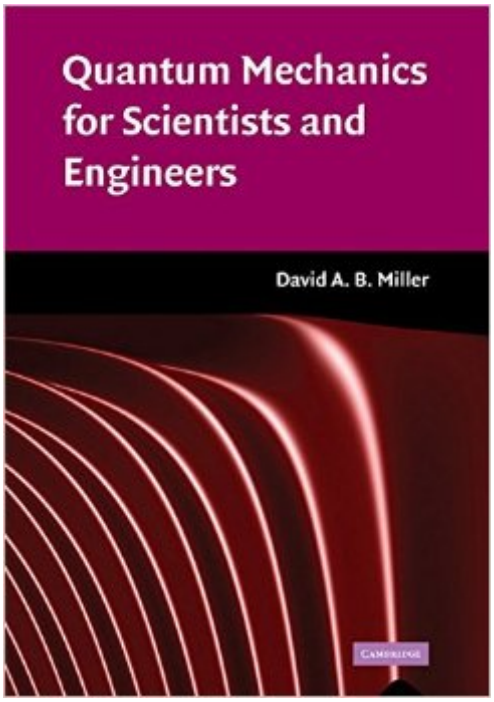
Quantum Mechanics For Scientists And Engineers



Synopsis

If you need a book that relates the core principles of quantum mechanics to modern applications in engineering, physics, and nanotechnology, this is it. Students will appreciate the book's applied emphasis, which illustrates theoretical concepts with examples of nanostructured materials, optics, and semiconductor devices. The many worked examples and more than 160 homework problems help students to problem solve and to practice applications of theory. Without assuming a prior knowledge of high-level physics or classical mechanics, the text introduces Schrodinger's equation, operators, and approximation methods. Systems, including the hydrogen atom and crystalline materials, are analyzed in detail. More advanced subjects, such as density matrices, quantum optics, and quantum information, are also covered. Practical applications and algorithms for the computational analysis of simple structures make this an ideal introduction to quantum mechanics for students of engineering, physics, nanotechnology, and other disciplines. Additional resources available from www.cambridge.org/9780521897839.

Book Information

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Customer Reviews

Many textbooks, in general, suffer in readability due to the author assuming the reader thinks just as he or she does, or knows a sufficient amount of information prior to reading. David Miller is one of those authors that is just the opposite: he never assumes you know anything that isn't in his book (other than that you know how to read and do basic math). In addition, Miller has the unique ability to relate complex and complicated concepts to common examples. You will find that reading

through this text is much smoother than with other textbooks. There are also solutions to certain problems and viewgraphs available for free online.The topics in the book cover the basic quantum mechanical scenarios, such as simple 1D/3D potentials, operators, the uncertainty principle (taught in two ways...Griffiths provides a third), matrix formalism, Dirac notation, angular momentum, spin, and the Hydrogen atom. In addition, more advanced topics, such as perturbation theory (time independent and dependent), the density matrix, and approximation techniques. Miller also relates much of the material to photonics topics, such as absorption, Fermi's Golden Rule, non-linear effects, refractive index, and much more. As an EE professor, he also covers some band theory of crystalline solids.I feel that this book is extremely complete and will be extremely useful for anyone wanting to learn Quantum Mechanics. I've also used Griffiths and Singh, which are also excellent texts. I feel that Griffiths accompanies this text very well (so having both is more than complete). I have yet to find an error in the text, and this is most likely because Miller wrote this originally as a course reader that was published through Stanford. The course reader has been used by other professors and hundreds of student prior to publishing. This means that your learning won't be plagued or interrupted with errors, or with the need to purchase a new edition.

This is a textbook like no other: Clear. Honest. Eloquent. Thorough. Typo-free. Readable.Reading Quantum Mechanics for Scientists and Engineers feels like nothing more than a friendly chat with Dave Miller about the nature of the universe. This year, as an undergrad EE major at Stanford, I took the quantum mechanics course from which this book emerged, using the book as a primary textbook and reference. You can pick up this book with nothing but a basic linear algebra background--the simple math relevant to QM is reviewed in the appendix--and immediately dive in, learning from cover to cover without ever feeling lost in the vast world of QM. A fantastic teacher and writer, Prof. Miller devotes particular attention to practical methods for using quantum mechanics in engineering (e.g., transfer matrix, perturbation theories, various approximation methods). That said, he never fails to explore and explain the theoretical and philosophical aspects of QM, giving a satisfyingly honest sense of certainty to an inherently uncertain field.Without a clear guide, learning (and using) quantum mechanics can be a frightening endeavor for students and experienced researchers alike. With this book in hand, you'll quickly find that David Miller is the right man for the job.

As a physicist, I bought this book more for curiosity than to study itself. And I must confess I was really surprised by the conciseness of the text. It is a really nice and good introductory book. It

doesn’t go into the details and math formalism, but it does provide a nice physical insight, as well as good explanations. I recommend this book if you are looking for an introductory quantum mechanics text.

I am teaching myself quantum mechanics with the goal of understanding original research articles. I have found Miller to be extraordinarily well written and suitable for self-study. As an overall introduction to QM for self-study, I think Miller would be hard to beat, providing a nice balance between physical applications and mathematics. (For those sensitive to the physical quality of a book, Miller is very nicely produced and easy on aging eyes.)

My major is physics, and i bought this book for self-learning. The book is clear and requires less background knowledge, 2 years of basic college math and physics are enough. The book was well written with good explainations. Specialy with appendices can help you know what physics, math background you need for the subject.

I agree with most of the reviewers that gave this book high marks. The book is easy to read and well written, and at the same time it gives you a good and accurate representation of QM (ie, its not too watered down). I found it a good background book that allows me to move on to more advanced books when needed.The old Kindle version had horrible formatting, you could barely read the equations. But the new Kindle version of this book, as sold here, reads very well on a Kindle for PC. Equations are very readable, as is the graphical material. The equations are still a little small on a Kindle Fire HD, but they are readable. Not sure how the equations would be on a larger tablet like an iPad or something.

For engineers and applied physicists especially, this finely-crafted, comprehensive description of quantum mechanics (QM) and it’s application to many real-world problems, especially in photonics - is a real gem.It is beautifully written, with crystal-clear explanations of the concepts and basic-math involved, unlike many dry and mostly-advanced-math texts on the subject.Careful explanations of all the key basic concepts in QM, well-chosen words describing the essence of nearly every equation - together with various highly-relevant and useful worked-examples - really set this book well above the rest.

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