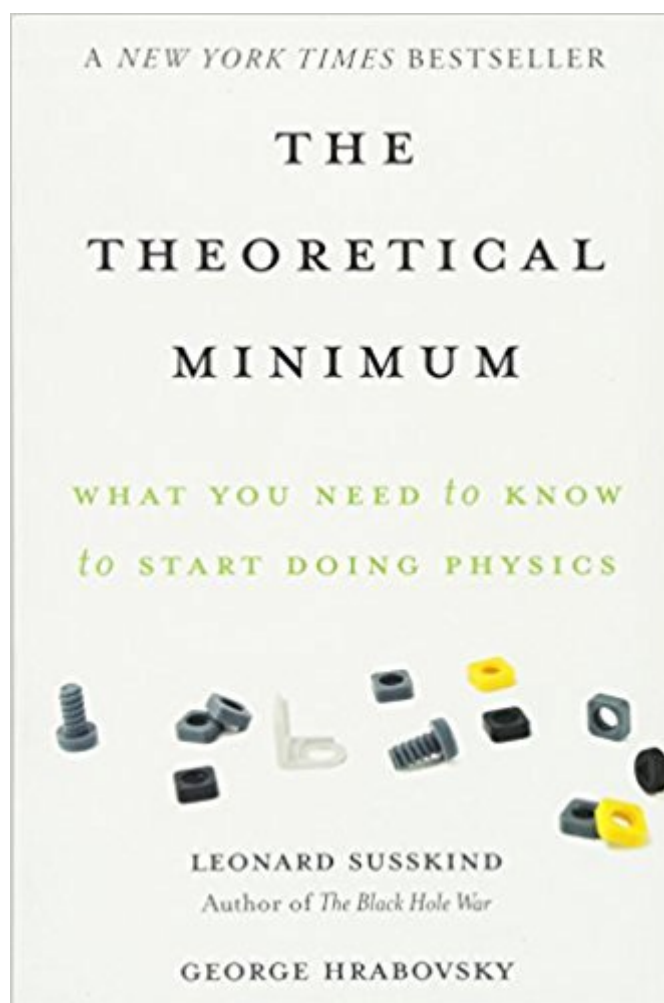


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# The Theoretical Minimum: What You Need To Know To Start Doing Physics



## Synopsis

A Wall Street Journal Best Book of 2013 If you ever regretted not taking physics in college; or simply want to know how to think like a physicist; this is the book for you. In this bestselling introduction, physicist Leonard Susskind and hacker-scientist George Hrabovsky offer a first course in physics and associated math for the ardent amateur. Challenging, lucid, and concise, The Theoretical Minimum provides a tool kit for amateur scientists to learn physics at their own pace.

## Book Information

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Science Blogs: Built on Facts; [A] charming and erudite instance of a genre with very few members â” a pop-physics book with partial differential equations on a good fraction of the pages.... More impressive still is that the book entirely resists the temptation to skip to the good stuff â” quantum mechanics and so on. This is a book which is purely about classical mechanics.... [S]ucceeds admirably in its goal. It presents classical mechanics in all its glory, from forces to Hamiltonians to symmetry and conservation laws, in a casual but detailed style.â” Scientific American’s Cocktail Party Physics blog; it’s clear, insightful, and designed for those hardcore physics fans who’ve read all the popular treatments and now might be interested in moving out of the armchair into the real action of actually engaging in theoretical physics.â” Physics World; Very readable. Abstract concepts are well explained.... [The Theoretical Minimum] provide[s] a clear description of advanced classical physics concepts, and gives readers who want a challenge the opportunity to exercise their brain in new ways.â” Home Education Magazine; In

combination with the online lectures, The Theoretical Minimum provides the student who is proficient in algebra, trigonometry and calculus a thorough introduction to theoretical physics. •Wall Street Journal, Best Books of 2013•Every minute of our lives is now dependent on technology, yet the wonders of basic science are foreign to many of us. Everyone who remembers even a bit of math should read this inviting and accessible account of what you need to know to start doing physics. •Wall Street Journal•So what do you do if you enjoyed science at school or college but ended up with a different career and are still wondering what makes the universe tick?... Leonard Susskind and George Hrabovsky's The Theoretical Minimum is the book for you. In this neat little book the authors aim to provide the minimum amount of knowledge you need about classical physics...to gain some real understanding of the world.... They do so with great success;. Along the way you get beautifully clear explanations of famously difficult things like differential and integral calculus, conservation laws and what physicists mean by symmetries.... Messrs. Susskind and Hrabovsky's book is a powerful exposition of why science is real and a counter to the kind of wishful thinking employed by people who, for whatever reason, reject the scientific worldview. •

Leonard Susskind has been the Felix Bloch Professor in Theoretical Physics at Stanford University since 1978. He lives in Palo Alto, California. George Hrabovsky is the president of Madison Area Science and Technology (MAST), a nonprofit organization dedicated to scientific and technological research and education. He lives in Madison, Wisconsin.

I majored in humanities but I'm interested in math and science, and I find this book both challenging and rewarding. But as I worked through it I found a number of things that looked wrong. Eventually I Googled the book's web site and found an Errata file that I downloaded. It identified 58 errors, most of them in equations and many of them significant enough to thoroughly befuddle a careful reader who trusted the book as written. That's an appalling number of errors. Somebody at Basic Books ought to be looking for a new job. I recommend the book if you are interested and willing to read carefully, but if you can't wait for a second, corrected printing be sure to download the Errata before you dig in!

This 220 page 6 x 8.5 little text is packed with valuable nuggets, and does NOT shy away from advanced math. This book is based on the popular Stanford, online and YouTube "adult ed" lectures and is targeted at scientists and "amateurs" who missed physics in undergrad but are still

interested. NOT a "popular" physics book with a bunch of fluffy, non-substantial speculation about membranes, strings, fractals, superpositioned states and multiple universes! Has real, tough, solid content with a LOT of advanced formulas, including tensors and many partial derivatives. You CAN "get" these with supplemental study, but the pace of the 11 lectures included is fast enough to leave you behind very quickly if you're rusty in math. I teach ordinary differential equations to non-engineers at classpros dot com, including Psychologists interested in the latest progress in nonlinear dynamical systems as applied to neurons, behavior, etc. This book is a real GEM as an intro to those topics, without "dumbing down" the content for a "lay" audience. If you love reading populist texts on quantum physics, etc. this wonderful book will take you all the way from classic upwards, with the requisite math, and will provide a great foundation for really getting what's going on in the more advanced areas. Unfortunately, the math will scare lots of folks off, but please, don't be one of them! The 11 lectures included are: 1. Classical Physics, 2. Motion, 3. Dynamics, 4. Multiple Particle Systems, 5. Energy, 6. Least Action Principle, 7. Symmetries and Conservation, 8. Hamiltonian Mechanics, 9. Phase Space Fluid and Gibbs-Liouville, 10. Poisson Brackets, Angular Momentum, Symmetries, 11. Electric and Magnetic Forces. There also is an appendix on Central Forces and Planetary Orbits and "math interludes" on Trig, Vectors, Integrals and PDE's. NOTE that only classical mechanics are covered here, HOWEVER circular motion and momentum are covered, and if you've seen the "Feynman" approach to QED (QED: The Strange Theory of Light and Matter), you know that even advanced Physics grad students were astonished that Richard was able to use "clock metaphors" and circular momentum to explain Quantum math and mechanics that normally take a grad student 3 years to master! Nothing is covered in a LOT of depth, for example there's little on computational complexity, but the theory of information conservation is touched on briefly as the "most fundamental of all physical laws" -- the cyclic "memory" of where we start and end! The REALLY COOL thing is that the authors don't talk down to us, they assume that just as "amateurs" can discover new stars in Astronomy, non-college types can also make great new contributions in Physics! No fooling, no tongue in cheek. Seems like a revolutionary view from Stanford types, but perhaps they've seen the future of distributed, non-brick and mortar education for real! At under 20 bucks this is a MUST HAVE even for HS students in my humble opinion. GREAT GIFT for a bright grandchild for their 18th birthday as well! This is such an original math refresher too, that I'm guessing a lot of folks will also use it to brush up on applied math. By page 60 we're already at differential equations-- so hang on to your saddle! Library Picks reviews always buys the books we review and has nothing to do with authors, publishers or , our focus is exclusively on the ROI of buyers.

This "The Theoretical Minimum" series is one of a kind. It bills itself as text book for the self learner. Unlike a dumbed down popular science book this is the real deal - seeks to explain the world via mathematics, in the same manner a physicist does. But unlike a text book it doesn't teach by repetition and exercises. Nor does it assume you have taken the appropriate pre-requisite maths course. Instead it takes you step by step through the whole through whole box and dice. Don't know calculus or maybe you've forgotten your trig identities? Don't worry - it's covered in the just enough depth to understand what follows. It's done without jargon and in a very readable tone, with the more difficult topics covered from several angles so you have a hope of gaining the insight needed from one of them. And it's done with the insight and understand of a man who is not only of the the leading experts in his field, he's also been teaching it for years. Given the topic it isn't easy going. Trying to get my head around things that weren't covered in high school physics when I did it is a struggle - like why the Lagrangian could possibly work. But it is possible, and with the pleasant tone of the book even pleasant. In this day and age where one could potentially teach yourself in our newly connected world, this is the only series of books I've come across that delivers on the promise. For now it is one of a kind. Now Susskind has shown how it is done I hope we will see more.

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