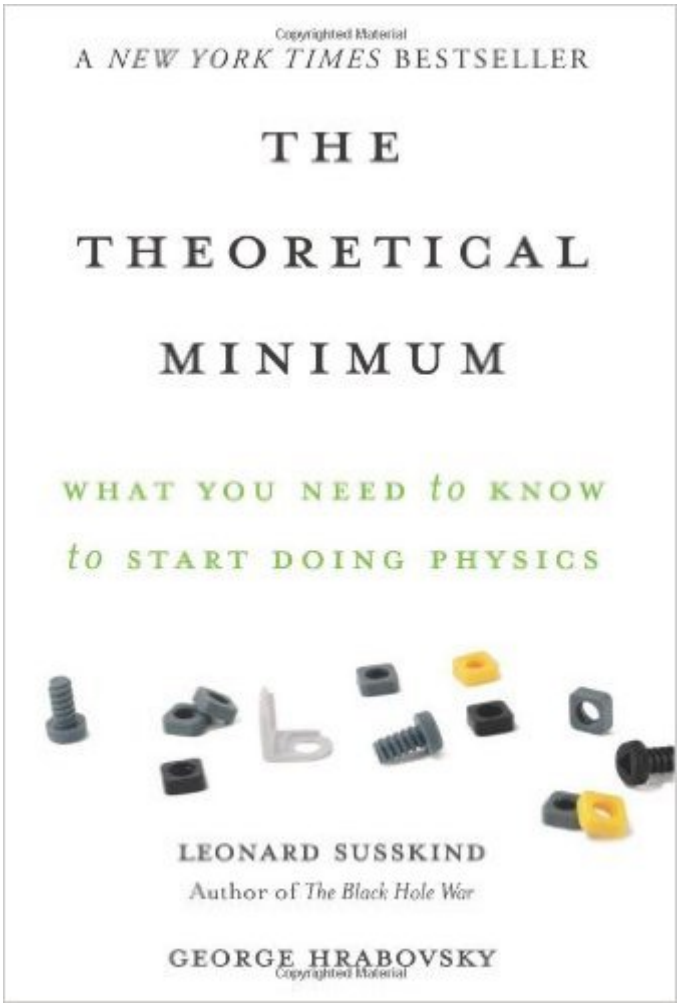
The Theoretical Minimum: What You Need To Know To Start Doing Physics



Synopsis

A Wall Street Journal Best Book of 2013If 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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Customer Reviews

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, stings, 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.

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!

The "Theorical Minimum" was the name of the exam that applicants had to pass in order to enter the theoretical physics department of the Kharkov Physicotechnical Institute headed by Lev Davidovich Landau. L. D. Landau, along with A.I. Kitaigorodskii, is also known to have written a serie of four great popular science books presenting general physics to young people, "Physics for everyone" (which happens to be the name of Leonard Susskind's blog too...). I'm wondering if "The Theoretical Minimum: what you need to know to start doing physics" couldn't be the first book of a follow-up to "Physics for everyone".I've studied physics in university but I've stopped before starting working on a PhD. That was more than ten years ago and I needed to earn a living but I still loved science especially physics. One day I've discovered the Leonard Susskind's Theoretical Minimum courses on Youtube and Itunes and I was litterally astonished by them as they are exactly what I was looking for: not courses for advanced undergraduate students, not popular science presentations devoid of any technicity (theoretical physics without maths is an empty shell: theoretical physics is about creating mathematical models of the physical world) but courses for people like me who knew some maths and physics at one point of their life and that want to learn the concepts of theoretical physics. Each course is made of about ten lectures, each lectures lasting about two hours. Watching these is quite time consuming and time is sparse if you have a job and a family. Also the courses were sometimes a little sketchy or not quite well organized (especially the first run... the second run is a lot better). The material simply had to be reworked and layed out on paper. George Hrabovsky felt these were necessary too so he contacted Leonard Susskind and voila, we now have a book, the first of a whole serie, the one about classical mechanics.I knew about some of the material in the book. In the quantum mechanics (QM) courses I followed I learned about least-action principle, Lagrangians, Hamiltonians (fundamental in QM) and Poisson brackets (their siblings, commutators, are also fundamental in QM). The problem is that these notions and their purpose didn't make sense to me. I wasn't told or I didn't have time to realize their conceptual power and that they could be used in classical mechanics: use of Lagrangian formalism to understand the double pendulum, use of Poisson brackets to determine the behavior of a charged rotor in a magnetic field. Also I wasn't told about Noether's theorem (relationship between symmetries and conserved quantities), Liouville's theorem (well perhaps in statistical mechanics... I'm not sure) or the importance of gauge fields (vector potential field is one) but that may be because I wasn't taught to be a theoricist. Here Leonard Susskind's a guide who shows us the elegance of all these concepts and prepares us to a voyage to quantum physics and field theories.The book shows the coherence of these concepts, it structures the reader's mind (if he

makes the proper efforts by doing the exercises: doing exercises are necessary to learn and understand). George Hrabovsky brought us a great contribution by making the text more accessible (in the videos the student is assumed to know about calculus and general physics) and whipping out ambiguities. The book isn't entirely self-contained though (for example total differentials or Taylor series are used without these notions being introduced... just search "Taylor series" and "total derivative" in Wikipedia) but George will provide some support to the reader in his web site.Theoretical Minimum - Classical Mechanics isn't another popular science book. It's a book that you'll have to work through a bit but it's a book that will structure your perception of our physical world. This book is the first of a serie that could become somehow the theoretical physics equivalent of Feynman's Lectures. You won't become a theorical physicist just by working through this book and the ones that will follow (have a look at a Quantum Field Theory textbook and you'll see). However if you are interested in physics (not only theoretical) the book will tell you about the concepts used in physics, how physicists manipulate them, how physicists do math and what makes physicists tick.I really hope that this book will be translated in many languages.

(Standard ASCE/SEI 7-10) The Lean Product Playbook: How to Innovate with Minimum Viable Products and Rapid Customer Feedback Platform Scale: How an emerging business model helps startups build large empires with minimum investment