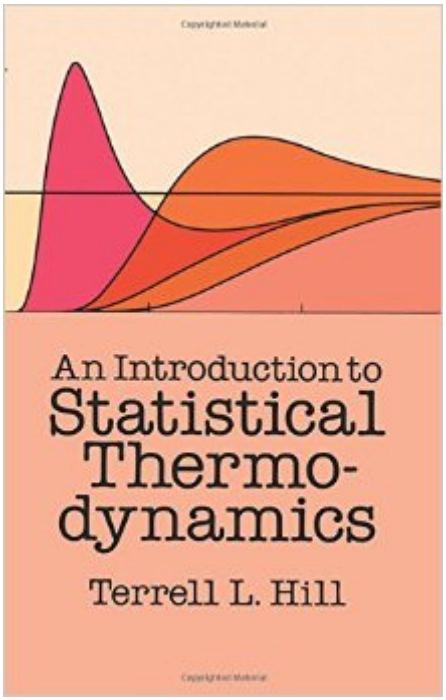
An Introduction To Statistical Thermodynamics (Dover Books On Physics)



Synopsis

"A large number of exercises of a broad range of difficulty make this book even more usefulâ |a good addition to the literature on thermodynamics at the undergraduate level." â ” Philosophical MagazineAlthough written on an introductory level, this wide-ranging text provides extensive coverage of topics of current interest in equilibrium statistical mechanics. Indeed, certain traditional topics are given somewhat condensed treatment to allow room for a survey of more recent advances.The book is divided into four major sections. Part I deals with the principles of quantum statistical mechanics and includes discussions of energy levels, states and eigenfunctions, degeneracy and other topics. Part II examines systems composed of independent molecules or of other independent subsystems. Topics range from ideal monatomic gas and monatomic crystals to polyatomic gas and configuration of polymer molecules and rubber elasticity. An examination of systems of interacting molecules comprises the nine chapters in Part III, reviewing such subjects as lattice statistics, imperfect gases and dilute liquid solutions. Part IV covers quantum statistics and includes sections on Fermi-Dirac and Bose-Einstein statistics, photon gas and free-volume theories of quantum liquids.Each chapter includes problems varying in difficulty â ” ranging from simple numerical exercises to small-scale "research" propositions. In addition, supplementary reading lists for each chapter invite students to pursue the subject at a more advanced level. Readers are assumed to have studied thermodynamics, calculus, elementary differential equations and elementary quantum mechanics.Because of the flexibility of the chapter arrangements, this book especially lends itself to use in a one-or two-semester graduate course in chemistry, a one-semester senior or graduate course in physics or an introductory course in statistical mechanics.

Book Information

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Customer Reviews

Written in 1960 and revised in 1986 this is a general treatise onstat-thermo in the tradition of Tolman and McQuarrie. I have a wellused copy on my desk, bought originally as a textbook for a graduatecourse - probably the cheapest textbook I ever bought at $12.95.The first chapter derives the ensembles from the quantum perspective.This has the advantage of generality and the disadvantage thatit requires some rudimentary knowledge of quanta and is lessexpedient for the scientist who is only concerned with classicalstat-mech.Once the foundations are laid, the book is divided intoapplications to non-interacting and interacting systems. In thelatter category is the virial expansion for imperfect gases. Thisderivation makes an unnecessary effort to introduce a relativeactivity. The derivation in Jackson’s book is more transparentand shorter without sacrificing rigor. The Mayer expansion forhard spheres is treated in useful detail.Chapter 18 includes a good description of the Debye-Hueckel theoryof electrolytes. The derivation of the Flory-Huggins theory ofpolymer solutions in Chapter 21 is excellent - more concise andeffortless than all others that I have seen. Chapter 14 covers thesolution of the one-dimensional Ising magnet but I still have troubleunderstanding this one. The appendices are useful and includethe maximum term method and method of undetermined multiplierswhich are the cornerstone of the fundamental theorems.

Twenty five years since I’ve seen a classroom. I had a burning desire to pick up where I left off. What I needed was a good introduction but I could not find my "Elements of Statistical Thermodynamics" by K. Nash (an excellent little book). So I tried Chandler’s book, modern but not a beginners text. For the true beginner, I’d suggest "Intro. To Thermophysics by Espinola, WCB (c) 1994". After Espinola, go to Hill’s book a great bridge at a bargin before going to Chandler. Hill’s style is clear but examples are given a condensed treatment. Not a problem solving book, but a good book if physical understanding and a bridge forward is your goal.

If you are intrested with studing statistical mechanics then start here. Hill starts from the defintions and postulates of thermodynamics and then moves into applications and problems. You will need to understand Diff EQ for this book.The first chapter took me a week to read and work out the math but

then I red the rest in 4 weeks. It is a hard start because Hill develops your background before starting with applications of the theory. I really began to grasp the subject after reading this book. Ohter books will not lay the mathout as well as Hill does. It is a hard read because Hill is so thorough, but the rewasd is well worth the struggle. It is a great introduction and I suggest all of Hill's Stat mech book. Another great bargin from DOVER PRESS.At the price I recomend it to all graduate chemical engineers and chemists

I am a devout follower of this book - it's written by a genius for people who really want to understand stat thermoD, not just to prepare for classes, but to gain a perspective on how to handle the tedious mathematical structure of stat themoD. I am absolutely in love with this book and have found it to be much much more challenging and interesting that other comparable books, which border on spoon feeding its reader with every morbid detail (most of which are often quite basic concepts). It's to the point, written with authority. He covers quite a large number of topics. Although the book is quite old, its structure is very appealing to me.Those who like succinct equations to try and understand a concept - they would love with this book, right from the very first chapter. This book has another complementary book by the same author (Statistical Mechanics: Principles and Selected Applications) which takes things a step further. People who prefer long discussions rather than equations would absolutely hate this book. I would strongly reccommend everybody to take a chance with this book. I am a beginner only and do not have a good idea about the other books out there - but I find this book much more useful than those by Landau or Macquarrie (although I dunno about Chandler or Kardar or Pahtria). People with a decent math background who are looking to learn stat mech should absolutely try this out and it's so damn cheap - wouldn't hurt if you don't like it eventually. But I like this book so much that I would even volunteer to be a spokesperson for it :P

This is an ancient stat. mech. book with a lot of old topics. Most of the chapters after 8 (there are 22 I think) are directed towards chemical applications. I think this book and McQuarrie are about even, Chandler is better if you know a little about stat mech already, much much worse if you know nothing. This book is also really cheap so I don't think you can go wrong in getting it. The explanations are pretty good in both this and McQuarrie, though I don't always like the organization of Hill.

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