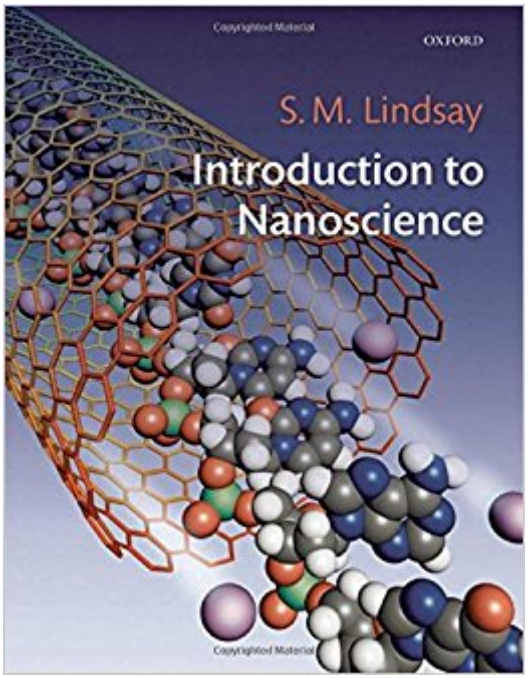
Introduction To Nanoscience



Synopsis

Nanoscience is not just physics, chemistry, engineering, or biology, but rather an integration of all of these disciplines. The first comprehensive and interdisciplinary text of its kind, Introduction to Nanoscience is an ideal handbook for advanced undergraduates and beginning graduate students in physics, chemistry, electrical engineering, materials engineering, chemical engineering, bioengineering, and biology.Written from the ground up for a diverse audience, the book is divided into three parts. Part I (The Basics) offers a self-contained introduction to quantum mechanics, statistical mechanics, and chemical kinetics that requires no more than a basic background in college calculus. The author's conceptual approach and an array of examples and conceptual exercises enable even those students with limited mathematical knowledge to grasp the majority of the essential material. Part II (Tools) covers microscopy, single molecule manipulation and measurement, nanofabrication, and self-assembly. Part III (Applications) covers electrons in nanostructures, molecular electronics, nano-materials and nanobiology. Each chapter starts with a survey of the required basics and ends by making contact with current research literature.Introduction to Nanoscience is also the first text to incorporate the often-neglected topic of complexity in nanosystems, dealing explicity with emergent phenomena from chemistry to biology. Examples include Kramer's theory of reactions (Chapter 3); the Marcus theory of electron transfer (Chapter 8); and enzyme catalysis, molecular motors, and fluctuations in gene expression and splicing, all covered in Chapter 9. In addition, the book includes Richard Feynman's visionary essay, "There's Plenty of Room at the Bottom," which describes the consequences of smallness and quantum behavior.

Book Information

Paperback: 472 pages
Publisher: Oxford University Press; Pap/Cdr edition (December 20, 2009)
Language: English
ISBN-10: 0199544212
ISBN-13: 978-0199544219
Product Dimensions: 9.6 x 1 x 7.4 inches
Shipping Weight: 2.3 pounds (View shipping rates and policies)
Average Customer Review: 4.7 out of 5 stars 4 customer reviews
Best Sellers Rank: #593,431 in Books (See Top 100 in Books) #88 inÂ Books > Science & Math > Physics > Nanostructures #99 inÂ Books > Science & Math > Technology > Nanotechnology

#20523 inÂ Books > Textbooks > Science & Mathematics

Customer Reviews

"The book covers a lot of ground and combines a thoroughness of treatment with a lightness of touch. It is attractive for both undergraduate students seeking clear explanations and graduate students wanting depth." --Stephen Blundell, Oxford University

Stuart Lindsay is Nadine and Edward Carson Professor of Physics and Chemistry at Arizona State University. He wasAssistant Professor of Physics at Arizona State University, 1979, Co-Founder of the Molecular Imaging Corporation, 1993 (now part of Agilent Technologies), Edward and Nadine Carson Presidential Chair in Physics, 2002 - present, Professor of Chemistry, 2003 - present, and Consultant with Agilent Technologies, 2005 - present. He has held several administrative positions: Director Center for Singe Molecule Biophysics ($1M state budget, $3M external funding), Vice President, RandD, Molecular Imaging Corporation, 1994-2000, Interim Director, Center for Solid State Physics, 1991-1992, and Associate Chair, Department of Physics, 1985 - 1989. He has also received several honors and awards: Fellow of the American Association for the Advancement of Science, 2003, Fellow of the American Physical Society, 1990, RandD 100 Award, 2004, Arizona Innovator of the Year (shared) 1999, Humbolt Senior Scientist Research Award (1993), ASU Awards: Outstanding Graduate Mentor (1990), and Faculty Distinguished Achievement Award (2007).

This book is an excellent introduction the the fundamentals of nanotechnology. The author has a surprisingly wide range of knowledge. He covers fundamental theory as well as anybody I’ve read (except Ricard Feynman) He includes an brief but cogent reviews of instrumentation and synthetic techniques. He explains these complex topics in a clear style. He even cleared up for me several obscure points on quantum mechanics.Warning! This books assumes some knowledge of physics and chemistry. Anyone scared off by equations should look elsewhere. Did he really have to dwell on a serious account of statistical mechanics? On the other hand, I could skim over some of the more difficult math with little loss.The descriptive sections a quite good. I had heard of amazing techniques such as Atomic Force Microscopy, but know I know how it works and where it is useful.

I am in the same department (as a physics phd student) as the author, whom I admire very much. I got this book because he will likely be on my committee and I want to make sure I know what he

considers introductory nanoscience! The book is well organized. It is mainly a crash course -- it doesnt explain everything from the ground up, there are a lot of instances where important derivations are skipped -- but there is a lot of practical need-to-know info that you won't find anywhere else, and many concepts are explained very nicely in new ways.I highly recommend it to grad students in biophysics, materials or solid-state physics.

I have the privilege to work as an undergraduate in one of Dr. Lindsay's research group. I think the course and book are top notch!

The book touches on all the general basis of nanoscience of which I was trying to develop an understanding... the book is pretty straight forward and holds lots of good information