



# Introduction to Nanoscience and Nanomaterials

*Dinesh C Agrawal*

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## Introduction to Nanoscience and Nanomaterials Dinesh C Agrawal

This textbook is aimed primarily at the senior undergraduate and first year graduate students from the various engineering and sciences departments including physics, chemistry, materials engineering, chemical engineering, electrical engineering, mechanical engineering, bioengineering, and biology. Researchers in the areas of nanomaterials and nanoscience will also find the book useful for building the background necessary to understand the current literature and as a reference book. The text assumes only a basic level of competency in physics, chemistry and mathematics. Some of the background material and introductory matter are included in the first few chapters and as appendices. Although this material may be familiar to some of the students, it is the author's experience after teaching such a course for many years that this can not be taken for granted and moreover, serves as a ready reference to understand the text.

As the area of nanoscience, nanotechnology and nanomaterials is a fast developing one, an approach which equips the students to comprehend the developing field rather than providing a large volume of information is essential. With this in view, while providing a broad perspective, the book emphasizes basics of nanoscience and nanoscale materials and goes into sufficient depth for the reader to be able to handle numerical problems. The treatment is kept at a level which is easily comprehensible to an undergraduate student. Solved examples are provided in each chapter to aid understanding and a set of problems is given at the end of each chapter.

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- Introduction
- Surfaces
- Zero Dimensional Nanostructures I Review of Some Topics in Physics
- Semiconductor Quantum Dots
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- Zero Dimensional Nanostructures IV Colloids and Colloidal Crystals
- Carbon Nanostructures
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- Bulk Nanostructured Materials
- Polymer Nanocomposites
- Molecules for Nanotechnology: Polymers, Biopolymers, Dendrimers and Surfactants
- Self Assembly and Self Organization

**Readership:** Senior undergraduate and graduate students in materials science and engineering.



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