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The text covers the topics such as crystal structures and chemical bonds, semiconductors, dielectrics, magnetic materials, superconductors and nanomaterials.

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Elements of Solid State Physics (September 21, 2007 ...

Solid-state physics is the study of rigid matter, or solids, through methods such as quantum mechanics, crystallography, electromagnetism, and metallurgy. It is the largest branch of condensed matter physics. Solid-state physics studies how the large-scale properties of solid materials result from their atomic-scale properties. Thus, solid-state physics forms a theoretical basis of materials science.

Solid-state physics - Wikipedia

Elements of Solid State Physics by J.P. Srivastava, October 30, 2004, Prentice-Hall of India Pvt.Ltd edition, Paperback

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Upper-level undergraduate course taught at the University of Pittsburgh in the Fall 2015 semester by Sergey Frolov. The course is based on Steven Simon's "Oxf...

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Solid State Physics is a vast subject matter and many good books available for graduate course. However for undergraduates, this book seemed to make a good connection to theoretical and experimental solid state physics at undergraduate level.

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Elements of Solid State Physics Second Edition M. N. Rudden and J. Wilson University of Northumbria at Newcastle, Newcastle upon Tyne, UK This textbook provides a basic introduction to the principles of solid state physics and semiconductor devices and will prove essential for first and second year students of physics, materials science and electrical/electronic engineering courses.

Elements of Solid State Physics (Paperback)

Advanced Solid State Physics Notes. This note covers the following Topics includes: Schrodinger Equation, Quantization, Quantization of the Electromagnetic Field, Photonic Crystals, Phonons, Electrons, Crystal Physics, Magnetism and Response to Electric and Magnetic Fields, Transport Regimes, Quasiparticles, Dielectrics and Ferroelectrics, Superconductivity.

This revised and updated Fourth Edition of the text builds on the strength of previous edition and gives a systematic and clear exposition of the fundamental principles of solid state physics. The text covers the topics, such as crystal structures and chemical bonds, semiconductors, dielectrics, magnetic materials, superconductors, and nanomaterials. What distinguishes this text is the clarity and precision with which the author discusses the principles of physics, their relations as well as their applications. With the introduction of new sections and additional information, the fourth edition should prove highly useful for the students. This book is designed for the courses in solid state physics for B.Sc. (Hons.) and M.Sc. students of physics. Besides, the book would also be useful to the students of chemistry, material science, electrical/electronic and allied engineering disciplines. New to the Fourth Edition • Solved examples have been introduced to explain the fundamental principles of physics. • Matrix representation for symmetry operations has been introduced in Chapter 1 to enable the use of Group Theory for treating crystallography. • A section entitled ‘Other Contributions to Heat Capacity’, has been introduced in Chapter 5. • A statement on ‘Kondo effect (minimum)’ has been added in Chapter 14. • A section on ‘Graphenes’ has been introduced in Chapter 16. • The section on ‘Carbon Nanotubes’, in Chapter 16 has been revised. • A “Lesson on Group Theory”, has been added as Appendix.

This introduction to solid state physics covers the basic problems of condensed matter (amorphous or glassy solids and liquid crystals). Ion lattice symmetry and its direct consequences are treated in the first chapter. Following the adiabatic approximation, the treatment is divided into two parts: the system of ions and the system of electrons. Interactions of the two systems are considered and the various properties of the solid, beginning with some general considerations on structure and phase transitions are also dealt with.

Elements of Solid State Physics Second Edition M. N. Rudden and J. Wilson University of Northumbria at Newcastle, Newcastle upon Tyne, UK This textbook provides a basic introduction to the principles of solid state physics and semiconductor devices and will prove essential for first and second year students of physics, materials science and electrical/electronic engineering courses. It assumes no prior knowledge of quantum or statistical mechanics and relies on simple models to illustrate the physical principles. However, the opportunity has been taken in this edition to extend the concept of energy bands to a consideration of E-k curves, and certain new material has been

added, notably relating to superconductivity and optoelectronic devices, including lasers, following significant developments in these areas. Elements of Solid State Physics, Second Edition, presents the student with an essentially non-mathematical approach to the subject. Arranged in a logical sequence with many clear illustrations, each chapter has a number of worked examples and discussion points, as well as questions and answers. Readers of this fully revised and updated edition will receive a thorough grounding in the principles of solid state physics and should have sufficient knowledge about modern electronic devices to proceed to more advanced texts in this area. Main Contents: Some Aspects of Modern Physics; Structure of Crystalline Solids; Theories of Conduction and Magnetism; Energy Bands in Solids; Quantum Theory of Conduction; Semiconductor Devices.

Problems after each chapter.

This textbook provides conceptual, procedural, and factual knowledge on solid state and nanostructure physics. It is designed to acquaint readers with key concepts and their connections, to stimulate intuition and curiosity, and to enable the acquisition of competences in general strategies and specific procedures for problem solving and their use in specific applications. To these ends, a multidisciplinary approach is adopted, integrating physics, chemistry, and engineering and reflecting how these disciplines are converging towards common tools and languages in the field. Each chapter discusses essential ideas before the introduction of formalisms and the stepwise addition of complications. Questions on everyday manifestations of the concepts are included, with reasoned linking of ideas from different chapters and sections and further detail in the appendices. The final section of each chapter describes experimental methods and strategies that can be used to probe the phenomena under discussion. Solid state and nanostructure physics is constantly growing as a field of study where the fascinating quantum world emerges and otherwise imaginary things can become real, engineered with increasing creativity and control: from tinier and faster technologies realizing quantum information concepts, to understanding of the fundamental laws of Physics. Elements of Solid State Physics and of Crystalline Nanostructures will offer the reader an enjoyable insight into the complex concepts of solid state physics.

Enables students to easily grasp basic solid state physics principles Keeping the mathematics to a minimum yet losing none of the required rigor, Understanding Solid State Physics clearly explains basic physics principles to provide a firm grounding in the subject. The author underscores the technological applications of the physics discussed and emphasizes the multidisciplinary nature of scientific research. After introducing students to solid state physics, the text examines the various ways in which atoms bond together to form crystalline and amorphous solids. It also describes the measurement of mechanical properties and the means by which the mechanical properties of solids can be altered or supplemented for particular applications. The author discusses how electromagnetic radiation interacts with the periodic array of atoms that make up a crystal and how solids react to heat on both atomic and macroscopic scales. She then focuses on conductors, insulators, semiconductors, and superconductors, including some basic semiconductor devices. The final chapter addresses the magnetic properties of solids as well as applications of magnets and magnetism. This accessible textbook provides a useful introduction to solid state physics for undergraduates who feel daunted by a highly mathematical approach. By relating the theories and concepts to practical applications, it shows how physics is used in the real world.

Solid State Physics is a textbook for students of physics, material science, chemistry, and engineering. It is the state-of-the-art presentation of the theoretical foundations and application of the quantum structure of matter and materials. This second edition provides timely coverage of the most important scientific breakthroughs of the last decade (especially in low-dimensional systems and quantum transport). It helps build readers' understanding of the newest advances in condensed matter physics with rigorous yet clear mathematics. Examples are an integral part of the text, carefully designed to apply the fundamental principles illustrated in the text to currently active topics of research. Basic concepts and recent advances in the field are explained in tutorial style and organized in an intuitive manner. The book is a basic reference work for students, researchers, and lecturers in any area of solid-state physics. Features additional material on nanostructures, giving students and lecturers the most significant features of low-dimensional systems, with focus on carbon allotropes Offers detailed explanation of dissipative and nondissipative transport, and explains the essential aspects in a field, which is commonly overlooked in textbooks Additional material in the classical and quantum Hall effect offers further aspects on magnetotransport, with particular emphasis on the current profiles Gives a broad overview of the band structure of solids, as well as presenting the foundations of the electronic band structure. Also features reported with new and revised material, which leads to the latest research

This book originated from a course which I developed for the Master's degree course in Molecular Engineering in Kyoto University. Most of the students had degrees in Chemistry and a limited experience of Physics and Mathematics. Since research in Molecular Engineering requires knowledge of some applications of solid state physics which are not treated in conventional physics texts it was necessary to devise a course which would build on their chemical background and enable them to read the contemporary literature of relevance to their research. I hope that this book will be found useful as a text for other advanced courses on material science for chemists. Molecular Engineering is concerned with the design and construction, at the molecular level, of materials which can fulfil specific functions. Thus the study of the forces between molecules and the influence of molecular shapes and electrostatic features on molecular properties are important. The mechanisms whereby, in the solid state, these produce cooperative effects, catalytic effects and abnormal electrical effects must be understood, at least qualitatively. The aim of this book has been to give insight into the mechanisms whereby molecules influence one another when they are close together.

A carefully developed textbook focusing on the fundamental principles of nanoscale science and nanotechnology.

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