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Written in an easy-to-read style that answers the needs of engineers and facilitates quick comprehension of a wealth of technical data and concepts, Infrared Optoelectronics is an essential source for optical, design, and electrical and electronic engineers.

The creation of affordable high speed optical communications using standard semiconductor manufacturing technology is a principal aim of silicon photonics research. This would involve replacing copper connections with optical fibres or waveguides, and electrons with photons. With applications such as telecommunications and information processing, light detection, spectroscopy, holography and robotics, silicon photonics has the potential to revolutionise electronic-only systems. Providing an overview of the physics, technology and device operation of photonic devices using exclusively silicon and related alloys, the book includes: Basic Properties of Silicon Quantum Wells, Wires, Dots and Superlattices Absorption Processes in Semiconductors Light Emitters in Silicon Photodetectors , Photodiodes and Phototransistors Raman Lasers including Raman Scattering Guided Lightwaves Planar Waveguide Devices Fabrication Techniques and Material Systems Silicon Photonics: Fundamentals and Devices outlines the basic principles of operation of devices, the structures of the devices, and offers an insight into state-of-the-art and future developments.

Developed from the authors' classroom-tested material, Semiconductor Laser Theory takes a semiclassical approach to teaching the principles, structure, and applications of semiconductor lasers. Designed for graduate students in physics, electrical engineering, and materials science, the text covers many recent developments, including diode lasers u

A "back-to-basics" guide to opto-electronic circuit design and construction. To successfully build and optimize opto-electronic circuits, you need to understand both the fundamentals of optics and electronics. Applied Electro-Optics provides engineers, designers and technicians with a firm background in both optical physics and circuit design. In Part I, the book introduces the basic theory of opto-electronics, including: Maxwell's equations and the wave nature of light Reflection and refraction, with extensive coverage of Snell's Law Interference phenomena and the Fabry-Perot interferometer Diffraction effects and diffraction gratings Polarization and electro-optic modulation Photons, basic quantum theory, and spectroscopic techniques Then, in Part II, the book introduces each major element of an electro-optic system. Understand semiconductor light sources such as LEDs and diode lasers, Consider optical transmitters and discover how to minimize the impact of electromagnetic interference through careful circuit location, grounding, and shielding. Review the basic structure and operation of photodiodes, phototransistors, optocouplers, and photoconductors. Then, learn practical techniques for managing the trade-offs required to integrate these devices into useful circuits. A full chapter on optical receivers demonstrates how to integrate photodetectors into useful receiver circuits, both amplifier and hybrid circuits are covered. Finally, walk step-by-step through building and optimizing circuits for a variety of applications, including CD players and infrared data transmission. If your goal is to build the best possible opto-electronic circuits or just to understand how they operate, Applied Electro-Optics delivers just the right balance of theory and practice to help you.

Fundamentals and Basic Optical Instruments includes thirteen chapters providing an introductory guide to the basics of optical engineering, instrumentation, and design. Topics include basic geometric optics, basic wave optics, and basic photon and quantum optics. Paraxial ray tracing, aberrations and optical design, and prisms and refractive optical components are included. Polarization and polarizing optical devices are covered, as well as optical instruments such as telescopes, microscopes, and spectrometers.

Aiming to provide the reader with a general overview of the mathematical and numerical techniques used for the simulation of matter at the microscopic scale, this book lays the emphasis on the numerics, but modelling aspects are also addressed. The contributors come from different scientific communities: physics, theoretical chemistry, mathematical analysis, stochastic analysis, numerical analysis, and the text should be suitable for graduate students in mathematics, sciences and engineering and technology.

The Compact Disc (CD), as a standardized information carrier, has become one of the most successful consumer products ever marketed. Although the original disc was intended for audio playback, its specific advantages opened very quickly the way towards various computer applications. The standardization of the Compact Disc Read-Only Memory (CD-ROM) and of all succeeding similar products, like Compact Disc interactive (CD-I), Photo and Video CD, CD Recordable (CD-R), and CD Rewritable (CD R/W), has substantially enlarged the range of possible applications. The plastic disc represented from the very beginning a removable medium of large storage capacity. The advent of the personal computer accompna nied by the increasing demand for both data distribution and exchange have strongly marked the evolution of the CD-ROM drive. The number of sold CD-ROM units exceeded 60 millions in 1997 when compared to about 2.5 millions in 1992. As computing power continuously improved over the years, computer pe ripherals have also targeted better performance specifications. In particular, the speed of CD-ROM drives increased from the so-called 1X in 1984 to dou ble speed in 1992, and further to 32X at the beginning of 1998. The average time needed to access data on disc has dropped from about 300 ms to less than 90 ms within the same period of time.

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