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About this book. This book provides a comprehensive account of fiber-optic communication systems. The 3rd edition of this book is used worldwide as a textbook in many universities. This 4th edition incorporates recent advances that have occurred, in particular two new chapters. One deals with the advanced modulation formats (such as DPSK, QPSK, and QAM) that are increasingly being used

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for improving spectral efficiency of WDM lightwave systems.

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Abstract. Optical fibers are used extensively for data transmission
systems because of their dielectric nature and their large

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information-carrying capacity. Network architectures using multiple wavelength channels per optical fiber are utilized in local, metropolitan, or wide-area applications to connect thousands of users having a wide range of transmission capacities and speeds.

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The author covers both the systems and components aspects of fiber-optic communication systems with a focus on the physics and technology behind them. The Third Edition has been updated to reflect the current state of the art of lightwave transmission systems, with particular emphasis on the rapid development of the WDM technology and system design issues pertaining to current topics of ...

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high-speed internet, or low-rate international telephone calls.

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Fiber-optic communication systems are lightwave systems that employ optical fibers for information transmission. Such systems have been deployed worldwide since 1980 and have revolutionized the field of telecommunications. Indeed, lightwave technology, together with microelectronics, led to the advent of the "information age" during the 1990s.

FIBER-OPTIC COMMUNICATION SYSTEMS

[1] Instruments for distributed fiber-optic measurement of temperature are now available with temperature resolution of 0.01°C and spatial resolution of 1 m with temporal resolution of

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The Institute of Optics, University of Rochester * ".readers searching for a wide ranging and up-date view of fibre optic communication systems would do well to purchase this book."--International Journal of Electrical Engineering Education (on the Second Edition) * This comprehensive, up-to-date account of fiber-optic communication focuses on the physics and technology behind fiber-optic communication systems while covering both the systems and components aspects * Provides extensive details on the WDM technology and system design issues that have developed since the last edition.

"This new title covers basic topics such as transmitters, fibers, amplifiers and receivers and details new developments such as nonlinear fiber-optic systems and nonlinear phase noise. Starting

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with a review of electromagnetics and optics, including Faraday's law and Maxwell's equation, it then moves on to provide information on optical fiber transmissions, laser oscillations, wave particle density and semiconductor laser diodes. This is followed up with chapters covering optical sources, optical modulators, optical receivers, including coherent receivers, and optical amplifiers. The final part of the book discusses performance analysis, channel multiplexing techniques, nonlinear effects and digital signal processing respectively"--

This book provides a comprehensive account of fiber-optic communication systems. The 3rd edition of this book is used worldwide as a textbook in many universities. This 4th edition incorporates recent advances that have occurred, in particular two

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new chapters. One deals with the advanced modulation formats (such as DPSK, QPSK, and QAM) that are increasingly being used for improving spectral efficiency of WDM lightwave systems. The second chapter focuses on new techniques such as all-optical regeneration that are under development and likely to be used in future communication systems. All other chapters are updated, as well.

An expert guide to the new and emerging field of broadband circuits for optical fiber communication This exciting publication makes it easy for readers to enter into and deepen their knowledge of the new and emerging field of broadband circuits for optical fiber communication. The author's selection and organization of material have been developed, tested, and refined from his many industry

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courses and seminars. Five types of broadband circuits are discussed in detail: * Transimpedance amplifiers * Limiting amplifiers * Automatic gain control (AGC) amplifiers * Lasers drivers * Modulator drivers Essential background on optical fiber, photodetectors, lasers, modulators, and receiver theory is presented to help readers understand the system environment in which these broadband circuits operate. For each circuit type, the main specifications and their impact on system performance are explained and illustrated with numerical values. Next, the circuit concepts are discussed and illustrated with practical implementations. A broad range of circuits in MESFET, HFET, BJT, HBT, BiCMOS, and CMOS technologies is covered. Emphasis is on circuits for digital, continuous-mode transmission in the 2.5 to 40 Gb/s range, typically used in SONET, SDH, and Gigabit Ethernet applications. Burst-

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mode circuits for passive optical networks (PON) and analog circuits for hybrid fiber-coax (HFC) cable-TV applications also are discussed. Learning aids are provided throughout the text to help readers grasp and apply difficult concepts and techniques, including:

- * Chapter summaries that highlight the key points
- * Problem-and-answer sections to help readers apply their new knowledge
- * Research directions that point to exciting new technological breakthroughs on the horizon
- * Product examples that show the performance of actual broadband circuits
- * Appendices that cover eye diagrams, differential circuits, S parameters, transistors, and technologies
- * A bibliography that leads readers to more complete and in-depth treatment of specialized topics

This is a superior learning tool for upper-level undergraduates and graduate-level students in circuit design and optical fiber communication.

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Unlike other texts that concentrate on analog circuits in general or mostly on optics, this text provides balanced coverage of electronic, optic, and system issues. Professionals in the fiber optic industry will find it an excellent reference, incorporating the latest technology and discoveries in the industry.

The state of the art of modern lightwave system design Recent advances in lightwave technology have led to an explosion of high-speed global information systems throughout the world. Responding to the growth of this exciting new technology, Lightwave Technology provides a comprehensive and up-to-date account of the underlying theory, development, operation, and management of these systems from the perspective of both physics and engineering. The first independent volume of this two-volume

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set, Components and Devices, deals with the multitude of silica- and semiconductor-based optical devices. This second volume, Telecommunication Systems, helps readers understand the design of modern lightwave systems, with an emphasis on wavelength-division multiplexing (WDM) systems. * Two introductory chapters cover topics such as modulation formats and multiplexing techniques used to create optical bitstreams * Chapters 3 to 5 consider degradation of optical signals through loss, dispersion, and nonlinear impairment during transmission and its corresponding impact on system performance * Chapters 6 to 8 provide readers with strategies for managing degradation induced by amplifier noise, fiber dispersion, and various nonlinear effects * Chapters 9 and 10 discuss the engineering issues involved in the design of WDM systems and optical networks Each chapter

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includes problems that enable readers to engage and test their new knowledge to solve problems. A CD containing illuminating examples based on RSoft Design Group's award-winning OptSim optical communication system simulation software is included with the book to assist readers in understanding design issues. Finally, extensive, up-to-date references at the end of each chapter enable students and researchers to gather more information about the most recent technology breakthroughs and applications. With its extensive problem sets and straightforward writing style, this is an excellent textbook for upper-level undergraduate and graduate students. Research scientists and engineers working in lightwave technology will use this text as a problem-solving resource and a reference to additional research papers in the field.

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This book describes in a comprehensive manner the components and systems of fiber optic communications and networks. The first section explains the theory of multimode and single-mode fibers, then the technological features, including manufacturing, cabling, and connecting. The second section describes the various components (passive and active optical components, integrated optics, opto-electronic transmitters and receivers, and optical amplifiers) used in fiber optic systems. Finally, the optical transmission system design is explained, and applications to optical networks and fiber optic sensors are detailed, including the most recent developments in switched networks, high bit-rate systems, and FTTH or radio over fiber.

Fiber Optic Essentials starts with a basic discussion on lightwaves

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and the phenomenon of refraction and reflection. It then goes on to introduce the reader to the field of fiber optics and covers some of the recent developments, such as fiber amplifiers, dispersion compensation and nonlinear effects. A number of other applications are also presented. Examples and comparison with everyday experience are provided wherever possible to help the reader's comprehension. Diagrams are also included to aid in the visualization of certain concepts.

Since the revival of coherent optical communications in 2006, significant progress has been made in the field. For example, spectral efficiency of optical communication systems has been increased from 0.8 b/s/Hz to over 14.0 b/s/Hz in a single mode fiber. This progress is the result of improved technologies such as

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advanced modulation, digital coherent detection, coding, and digital signal processing. The first part of the book is devoted to advanced modulation, coding, and multiplexing technologies. Various linear and nonlinear impairments and their digital mitigation methods are presented, followed by impairment-tolerant and hardware-efficient symbol and carrier recovery algorithms, plus issues and challenges in real-time implementation of high-speed digital coherent transceivers. The authors reveal important progress in photonic integration and performance monitoring, and look beyond WDM (wavelength division multiplexing) to space-division-multiplexing (SDM) based technologies, which can improve fiber and network capacity.

Discover the basic telecommunications systems principles in an

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accessible learn-by-doing format Communication Systems Principles Using MATLAB covers a variety of systems principles in telecommunications in an accessible format without the need to master a large body of theory. The text puts the focus on topics such as radio and wireless modulation, reception and transmission, wired networks and fiber optic communications. The book also explores packet networks and TCP/IP as well as digital source and channel coding, and the fundamentals of data encryption. Since MATLAB® is widely used by telecommunications engineers, it was chosen as the vehicle to demonstrate many of the basic ideas, with code examples presented in every chapter. The text addresses digital communications with coverage of packet-switched networks. Many fundamental concepts such as routing via shortest-path are introduced with simple and concrete examples. The treatment of

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advanced telecommunications topics extends to OFDM for wireless modulation, and public-key exchange algorithms for data encryption. Throughout the book, the author puts the emphasis on understanding rather than memorization. The text also: Includes many useful take-home skills that can be honed while studying each aspect of telecommunications Offers a coding and experimentation approach with many real-world examples provided Gives information on the underlying theory in order to better understand conceptual developments Suggests a valuable learn-by-doing approach to the topic Written for students of telecommunications engineering, Communication Systems Principles Using MATLAB® is the hands-on resource for mastering the basic concepts of telecommunications in a learn-by-doing format.

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A GUIDE TO THE FUNDAMENTAL THEORY AND PRACTICE OF OPTICAL COMMUNICATION Fiber Optic and Atmospheric Optical Communication offers a much needed guide to characterizing and overcoming the drawbacks associated with optical communication links that suffer from various types of fading when optical signals with information traverse these wireless (atmospheric) or wired (fiber optic) channels. The authors— noted experts on the topic— present material that aids in predicting the capacity, data rate, spectral efficiency, and bit-error-rate associated with a channel that experiences fading. They review modulation techniques and methods of coding and decoding that are useful when implementing communications systems. The book also discusses how to model the channels, including treating distortion due to the various fading phenomena. Light waves and their

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similarity to radio waves are explored, and the way light propagates through the atmosphere, through materials, and through the boundary between two materials is explained. This important book: Characterizes principal optical sources and detectors, including descriptions of their advantages and disadvantages, to show how to design systems from start to finish Provides a new method of predicting and dealing with the dispersive properties of fiber optic cables and other optical guiding structures in order to increase data stream capacity Highlights effects of material and multimode (multi-ray) dispersion during propagation of optical signals with data through fiber optic channels Presents modulation techniques and methods of coding and decoding that are useful when implementing communications systems Written for professionals dealing with optical and electro-optical communications, Fiber Optic and

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Atmospheric Optical Communication explores the theory and practice of optical communication both when the optical signal is propagating through the atmosphere and when it is propagating through an optical fiber.

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