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Communication Systems 5th
Edition

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Based on the popular Artech House classic, Digital Communication Systems Engineering with Software-Defined Radio, this book provides a practical approach to quickly learning the software-defined radio (SDR) concepts needed for work in the field. This up-to-date volume guides readers on how to quickly prototype wireless designs using

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SDR for real-world testing and experimentation. This book explores advanced wireless communication techniques such as OFDM, LTE, WLA, and hardware targeting. Readers will gain an understanding of the core concepts behind wireless hardware, such as the radio frequency front-end, analog-to-digital and digital-to-analog converters, as well as various processing technologies. Moreover, this volume includes chapters on

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timing estimation, matched filtering, frame synchronization message decoding, and source coding. The orthogonal frequency division multiplexing is explained and details about HDL code generation and deployment are provided. The book concludes with coverage of the WLAN toolbox with OFDM beacon reception and the LTE toolbox with downlink reception. Multiple case studies are provided throughout the book.

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Both MATLAB and Simulink source code are included to assist readers with their projects in the field.

Visible Light

Communications, written by leading researchers, provides a comprehensive overview of theory, stimulation, design, implementation, and applications. The book is divided into two parts – the first devoted to the underlying theoretical concepts of the VLC and the second part covers

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VLC applications.

Visible Light

Communications is an emerging topic with multiple functionalities including data

communication, indoor localization, 5G

wireless communication networks, security, and small cell optimization.

This concise book will be of valuable interest from beginners to researchers in the field.

An introductory treatment of communication theory as

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applied to the transmission of information-bearing signals with attention given to both analog and digital communications. Chapter 1 reviews basic concepts. Chapters 2 through 4 pertain to the characterization of signals and systems. Chapters 5 through 7 are concerned with transmission of message signals over communication channels. Chapters 8 through 10 deal with noise in analog and digital

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communications. Each chapter (except chapter 1) begins with introductory remarks and ends with a problem set. Treatment is self-contained with numerous worked-out examples to support the theory.

- Fourier Analysis
- Filtering and Signal Distortion
- Spectral Density and Correlation
- Digital Coding of Analog Waveforms
- Intersymbol Interference and Its Cures
- Modulation Techniques
- Probability Theory and

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Random Processes · Noise
in Analog Modulation ·

Optimum Receivers for
Data Communication

Communication Systems
Engineering

RF Analog Impairments
Modeling for

Communication Systems
Simulation

Communication Systems
2ed

Software-Defined Radio
for Engineers

Principles of
Communications

*With the growing complexity of
personal mobile communication
systems demanding higher data-rates*

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and high levels of integration using low-cost CMOS technology, overall system performance has become more sensitive to RF analog front-end impairments. Designing integrated transceivers requires a thorough understanding of the whole transceiver chain including RF analog front-end and digital baseband. Communication system engineers have to include RF analog imperfections in their simulation benches in order to study and quantify their impact on the system performance. Here the author explores key RF analog impairments in a transceiver and demonstrates how to model their impact from a communication system design viewpoint. He discusses the design aspects of the front end of transceivers (both receivers and transmitters) and provides the reader with a way to

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optimize a complex mixed-signal platform by taking into account the characteristics of the RF/analog front-end. Key features of this book include: Practical examples illustrated by system simulation results based on WiFi and mobile WiMAX OFDM transceivers An overview of the digital estimation and compensation of the RF analog impairments such as power amplifier distortion, quadrature imbalance, and carrier and sampling frequency offsets An exposition of the challenges involved in the design of both RF analog circuits and DSP communication circuits in deep submicron CMOS technology MATLAB® codes for RF analog impairments models hosted on the companion website Uniquely the book bridges the gap between RFIC design specification needs and

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communication systems simulation, offering readers RF analog impairments modeling knowledge and a comprehensive approach to unifying theory and practice in system modelling. It is of great value to communication systems and DSP engineers and graduate students who design communication processing engines, RF/analog systems and IC design engineers involved in the design of communication platforms. Presents main concepts of mobile communication systems, both analog and digital Introduces concepts of probability, random variables and stochastic processes and their applications to the analysis of linear systems Includes five appendices covering Fourier series and transforms, GSM cellular systems and more

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For one- or two-semester, senior-level undergraduate courses in Communication Systems for Electrical and Computer Engineering majors. This text introduces the basic techniques used in modern communication systems and provides fundamental tools and methodologies used in the analysis and design of these systems. The authors emphasize digital communication systems, including new generations of wireless communication systems, satellite communications, and data transmission networks. A background in calculus, linear algebra, basic electronic circuits, linear system theory, and probability and random variables is assumed.

*Analog and Digital Communications
Advanced Optical and Wireless
Communications Systems*

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*Simulation of Communication Systems
Signals and Systems*

Communication Systems, 3Rd Ed

Providing the underlying principles of digital communication and the design techniques of real-world systems, this textbook prepares senior undergraduate and graduate students for the engineering practices required in industry.

Covering the core concepts, including modulation, demodulation, equalization, and channel coding, it provides step-by-step mathematical derivations to aid understanding of background material. In addition to describing the basic theory, the principles of system and subsystem design are introduced, enabling students to

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visualize the intricate connections between subsystems and understand how each aspect of the design supports the overall goal of achieving reliable communications. Throughout the book, theories are linked to practical applications with over 250 real-world examples, whilst 370 varied homework problems in three levels of difficulty enhance and extend the text material. With this textbook, students can understand how digital communication systems operate in the real world, learn how to design subsystems, and evaluate end-to-end performance with ease and confidence. Much of contemporary communication occurs between

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and among small groups, whether in person in a work setting or on the Internet via email, Facebook, or instant messages. How we engage in our small-group communication in each medium matters. To be effective we have to consider our group roles, norms, cohesion, process, and phases of development, as well as our personal verbal and nonverbal communication and listening styles. To succeed as a member of a team, we need to consider the limits of our personal experience and perspective, recognize the creative strength of diverse perspectives in decision making and problem solving, develop our conflict-management skills, and

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strengthen our leadership skills. To be successful necessitates an understanding of group process, participation style, ethical group behavior, and the influences of the medium. Small Group and Team Communication explores all these different interconnections and the communication strategies we use in our work and social groups. The authors use the systems perspective as their core approach throughout the text, treating small groups as complex open systems reliant upon communication to achieve success. Many chapters highlight the importance of considering ethics and diversity in relation to a variety of topics. Harris and Sherblom address the growing

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influence of computer-mediated communication to this discipline. Real-world, applied examples show students that what they're learning aren't simply abstract concepts, but knowledge that will serve them outside the classroom.

The second edition of this accessible book provides readers with an introductory treatment of communication theory as applied to the transmission of information-bearing signals. While it covers analog communications, the emphasis is placed on digital technology. It begins by presenting the functional blocks that constitute the transmitter and receiver of a communication system. Readers will next learn about electrical noise

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and then progress to multiplexing and multiple access techniques. An Introduction to Analog and Digital Communications Cognitive Dynamic Systems (WCCS) University of Calgary Communication systems an introduction to signals and noise in electrical communication Thorough coverage of basic digital communication system principles ensures that readers are exposed to all basic relevant topics in digital communication system design. The use of CD player and JPEG image coding standard as examples of systems that employ modern communication principles allows readers to relate the theory to practical systems. Over 180 worked-out examples throughout the book aids readers in understanding basic concepts. Over 480

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problems involving applications to practical systems such as satellite communications systems, ionospheric channels, and mobile radio channels gives readers ample opportunity to practice the concepts they have just learned. With an emphasis on digital communications, *Communication Systems Engineering, Second Edition* introduces the basic principles underlying the analysis and design of communication systems. In addition, this book gives a solid introduction to analog communications and a review of important mathematical foundation topics. New material has been added on wireless communication systems—GSM and CDMA/IS-94; turbo codes and iterative decoding; multicarrier (OFDM) systems; multiple antenna systems. Includes thorough coverage of basic digital communication system principles—including source coding,

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channel coding, baseband and carrier modulation, channel distortion, channel equalization, synchronization, and wireless communications. Includes basic coverage of analog modulation such as amplitude modulation, phase modulation, and frequency modulation as well as demodulation methods. For use as a reference for electrical engineers for all basic relevant topics in digital communication system design.

About The Book: This best-selling, easy to read, communication systems book has been extensively revised to include an exhaustive treatment of digital communications. Throughout, it emphasizes the statistical underpinnings of communication theory in a complete and detailed manner.

Wireless technology is a truly revolutionary paradigm shift, enabling multimedia communications between

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people and devices from any location. It also underpins exciting applications such as sensor networks, smart homes, telemedicine, and automated highways. This book provides a comprehensive introduction to the underlying theory, design techniques and analytical tools of wireless communications, focusing primarily on the core principles of wireless system design. The book begins with an overview of wireless systems and standards. The characteristics of the wireless channel are then described, including their fundamental capacity limits. Various modulation, coding, and signal processing schemes are then discussed in detail, including state-of-the-art adaptive modulation, multicarrier, spread spectrum, and multiple antenna techniques. The concluding chapters deal with multiuser communications, cellular system design, and ad-hoc network design.

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Design insights and tradeoffs are emphasized throughout the book. It contains many worked examples, over 200 figures, almost 300 homework exercises, over 700 references, and is an ideal textbook for students.

Selected Chapters from Haykin:

Communication Systems, Fifth Edition
and Pahlavan: Networking Fundamentals

Modern Wireless Communications

Introduction to Communication Systems

An Introduction To Analog And Digital
Communications

Communication Systems

Design and MATLAB concepts have been integrated in text. ? Integrates applications as it relates signals to a remote sensing system, a controls system, radio astronomy, a biomedical system and seismology.

The study of communication systems

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is basic to an undergraduate program in electrical engineering. In this third edition, the author has presented a study of classical communication theory in a logical and interesting manner. The material is illustrated with examples and computer-oriented experiments intended to help the reader develop an intuitive grasp of the theory under discussion. ·

Introduction · Representation of Signals and Systems · Continuous-Wave Modulation · Random Processes · Noise in CW Modulation Systems · Pulse Modulation · Baseband Pulse Transmission · Digital Passband Transmission · Spread-Spectrum Modulation · Fundamental Limits in Information Theory · Error Control Coding · Advanced Communication

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Systems

A groundbreaking book from Simon Haykin, setting out the fundamental ideas and highlighting a range of future research directions.

*Visible Light Communications
Modeling, Methodology and
Techniques*

**COMMUNICATION SYSTEMS, 4TH
ED**

*Principles of Modern Communication
Systems*

*Theory and Design of Digital
Communication Systems*

Haykin examines both the mathematical theory behind various linear adaptive filters with finite-duration impulse response (FIR) and the elements of supervised neural networks. This

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edition has been updated and refined to keep current with the field and develop concepts in as unified and accessible a manner as possible. It: introduces a completely new chapter on Frequency-Domain Adaptive Filters; adds a chapter on Tracking Time-Varying Systems; adds two chapters on Neural Networks; enhances material on RLS algorithms; strengthens linkages to Kalman filter theory to gain a more unified treatment of the standard, square-root and order-recursive forms; and includes new computer experiments using MATLAB software that illustrate the underlying theory and

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applications of the LMS and RLS algorithms.

The clear, easy-to-understand introduction to digital communications
Completely updated coverage of today's most critical technologies
Step-by-step implementation coverage
Trellis-coded modulation, fading channels, Reed-Solomon codes, encryption, and more
Exclusive coverage of maximizing performance with advanced "turbo codes"
"This is a remarkably comprehensive treatment of the field, covering in considerable detail modulation, coding (both source and channel), encryption, multiple access

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and spread spectrum. It can serve both as an excellent introduction for the graduate student with some background in probability theory or as a valuable reference for the practicing communication system engineer. For both communities, the treatment is clear and well presented." - Andrew Viterbi, The Viterbi Group

Master every key digital communications technology, concept, and technique. Digital Communications, Second Edition is a thoroughly revised and updated edition of the field's classic, best-selling introduction. With

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remarkable clarity, Dr. Bernard Sklar introduces every digital communication technology at the heart of today's wireless and Internet revolutions, providing a unified structure and context for understanding them -- all without sacrificing mathematical precision. Sklar begins by introducing the fundamentals of signals, spectra, formatting, and baseband transmission. Next, he presents practical coverage of virtually every contemporary modulation, coding, and signal processing technique, with numeric examples and step-by-step implementation

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guidance. Coverage includes:
Signals and processing
steps: from information
source through transmitter,
channel, receiver, and
information sink Key
tradeoffs: signal-to-noise
ratios, probability of
error, and bandwidth
expenditure Trellis-coded
modulation and Reed-Solomon
codes: what's behind the
math Synchronization and
spread spectrum solutions
Fading channels: causes,
effects, and techniques for
withstanding fading The
first complete how-to guide
to turbo codes: squeezing
maximum performance out of
digital connections
Implementing encryption with

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PGP, the de facto industry standard Whether you're building wireless systems, xDSL, fiber or coax-based services, satellite networks, or Internet infrastructure, Sklar presents the theory and the practical implementation details you need. With nearly 500 illustrations and 300 problems and exercises, there's never been a faster way to master advanced digital communications. CD-ROM INCLUDED The CD-ROM contains a complete educational version of Elanix' SystemView DSP design software, as well as detailed notes for getting started, a comprehensive DSP

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tutorial, and over 50 additional communications exercises.

The four short years since Digital Communication over Fading Channels became an instant classic have seen a virtual explosion of significant new work on the subject, both by the authors and by numerous researchers around the world. Foremost among these is a great deal of progress in the area of transmit diversity and space-time coding and the associated multiple input-multiple output (MIMO) channel. This new edition gathers these and other results, previously scattered throughout

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numerous publications, into a single convenient and informative volume. Like its predecessor, this Second Edition discusses in detail coherent and noncoherent communication systems as well as a large variety of fading channel models typical of communication links found in the real world. Coverage includes single- and multichannel reception and, in the case of the latter, a large variety of diversity types. The moment generating function (MGF)-based approach for performance analysis, introduced by the authors in the first edition and referred to in literally

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hundreds of publications, still represents the backbone of the book's presentation.

Important features of this new edition include: * An all-new, comprehensive chapter on transmit diversity, space-time coding, and the MIMO channel, focusing on performance evaluation * Coverage of new and improved diversity schemes * Performance analyses of previously known schemes in new and different fading scenarios * A new chapter on the outage probability of cellular mobile radio systems * A new chapter on the capacity of fading channels

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* And much more Digital Communication over Fading Channels, Second Edition is an indispensable resource for graduate students, researchers investigating these systems, and practicing engineers responsible for evaluating their performance.

Fundamentals of
Communication Systems
Modern Digital and Analog
Communication Systems
Wireless Communications
Systems Design
Digital Communication over
Fading Channels
Application to OFDM-based
Transceivers

Introduction to Digital

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Communications explores the basic principles in the analysis and design of digital communication systems, including design objectives, constraints and trade-offs. After portraying the big picture and laying the background material, this book lucidly progresses to a comprehensive and detailed discussion of all critical elements and key functions in digital communications. The first undergraduate-level textbook

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exclusively on digital communications, with a complete coverage of source and channel coding, modulation, and synchronization.

Discusses major aspects of communication networks and multiuser communications Provides insightful descriptions and intuitive explanations of all complex concepts Focuses on practical applications and illustrative examples. A companion Web site includes solutions to

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*end-of-chapter problems
and computer exercises,
lecture slides, and
figures and tables from
the text*

*This best-selling, easy
to read book offers the
most complete discussion
on the theories and
principles behind
today's most advanced
communications systems.
Throughout, Haykin
emphasizes the
statistical
underpinnings of
communication theory in
a complete and detailed
manner. Readers are*

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guided though topics ranging from pulse modulation and passband digital transmission to random processes and error-control coding.

The fifth edition has also been revised to include an extensive treatment of digital communications.

Antennas and propagation are of fundamental importance to the coverage, capacity and quality of all wireless communication systems.

This book provides a solid grounding in

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antennas and propagation, covering terrestrial and satellite radio systems in both mobile and fixed contexts. Building on the highly successful first edition, this fully updated text features significant new material and brand new exercises and supplementary materials to support course tutors. A vital source of information for practising and aspiring wireless communication engineers as well as for

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students at postgraduate and senior undergraduate levels, this book provides a fundamental grounding in the principles of antennas and propagation without excessive recourse to mathematics. It also equips the reader with practical prediction techniques for the design and analysis of a very wide range of common wireless communication systems. Including: Overview of the fundamental electromagnetic

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principles underlying propagation and antennas. Basic concepts of antennas and their application to specific wireless systems.

*Propagation measurement, modelling and prediction for fixed links, macrocells, microcells, picocells and megacells
Narrowband and wideband channel modelling and the effect of the channel on communication system performance.*

Methods that overcome and transform channel impairments to enhance

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performance using diversity, adaptive antennas and equalisers. Key second edition updates: New chapters on Antennas for Mobile Systems and Channel Measurements for Mobile Radio Systems. Coverage of new technologies, including MIMO antenna systems, Ultra Wideband (UWB) and the OFDM technology used in Wi-Fi and WiMax systems. Many new propagation models for macrocells, microcells and picocells. Fully revised

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*and expanded end-of-
chapter exercises. The
Solutions Manual can be
requested from [http://www.wiley.com/go/saunders_](http://www.wiley.com/go/saunders_antennas_2e)
[antennas_2e](http://www.wiley.com/go/saunders_antennas_2e)*

*Perception-action Cycle,
Radar and Radio
Antennas and Propagation
for Wireless
Communication Systems
Digital Communications
Introduction to Digital
Communications
Wireless Communications
**This is the first textbook
which presents the theory
of pure discrete
communication systems and***

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its relation to the existing theory of digital communication. It is written for undergraduate and graduate students, and for practicing engineers. Since the first edition of this book was published seven years ago, the field of modeling and simulation of communication systems has grown and matured in many ways, and the use of simulation as a day-to-day tool is now even more common practice. With the current interest in digital mobile communications, a primary area of application of

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modeling and simulation is now in wireless systems of a different flavor from the 'traditional' ones. This second edition represents a substantial revision of the first, partly to accommodate the new applications that have arisen. New chapters include material on modeling and simulation of nonlinear systems, with a complementary section on related measurement techniques, channel modeling and three new case studies; a consolidated set of problems is provided at

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the end of the book.

Digital Communications is a classic book in the area that is designed to be used as a senior or graduate level text. The text is flexible and can easily be used in a one semester course or there is enough depth to cover two semesters. Its comprehensive nature makes it a great book for students to keep for reference in their professional careers. This all-inclusive guide delivers an outstanding introduction to the analysis and design of

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digital communication systems. Includes expert coverage of new topics: Turbocodes, Turboequalization, Antenna Arrays, Digital Cellular Systems, and Iterative Detection. Convenient, sequential organization begins with a look at the history and classification of channel models and builds from there.

*Communication Systems
Guide*

*Small Group and Team
Communication*

*Discrete Communication
Systems*

Adaptive Filter Theory

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Theory and Applications

em style="mso-bidi-font-style: normal;"Wireless Communications Systems Design provides the basic knowledge and methodology for wireless communications design. The book mainly focuses on a broadband wireless communication system based on OFDM/OFDMA system because it is widely used in the modern wireless communication system. It is divided into three parts: wireless communication theory

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(part I), wireless communication block design (part II), and wireless communication block integration (part III). Written by an expert with various experience in system design (standards, research and development)

An accessible, yet mathematically rigorous, one-semester textbook, engaging students through use of problems, examples, and applications.

This undergraduate

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textbook has been revised to include updated information on digital communication, while preserving its introduction to Fourier analysis. In addition, a new appendix has been added on cryptography.

Fifth Edition

Fundamentals and Applications

*Systems, Modulation, and Noise : Solutions Manual
2nd Edition*

This textbook introduces the advanced topics of: (i) wireless communications, (ii) free-space optical (FSO) communications, (iii)

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indoor optical wireless (IR) communications, and (iv) fiber-optics communications and presents these different types of communication systems in a unified fashion for better practical use. Fundamental concepts, such as propagation principles, modulation formats, channel coding, diversity principles, MIMO signal processing, multicarrier modulation, equalization, adaptive modulation and coding, detection principles, and software defined transmission are first described and then followed up with a detailed look at each particular system. The book is self-contained and structured to provide straightforward guidance to readers looking to capture

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fundamentals and gain theoretical and practical knowledge about wireless communications, optical communications, and fiber-optics communications, all which can be readily applied in studies, research, and practical applications. The textbook is intended for an upper undergraduate or graduate level course in optical communication. It features problems, an appendix with all background material needed, and homework.

With exceptionally clear writing, Lathi takes students step by step through a history of communications systems from elementary signal analysis to advanced concepts in communications theory. The first

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four chapters of the text present basic principles, subsequent chapters offer ample material for flexibility in course content and level. All Topics are covered in detail, including a thorough treatment of frequency modulation and phase modulation. Numerous worked examples in each chapter and over 300 end-of-chapter problems and numerous illustrations and figures support the content.

Features Explanations of practical communication systems presented in the context of theory. Over 300 excellent illustrations help students visualize difficult concepts and demonstrate practical applications. Over 120 worked-out examples

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promote mastery of new concepts, plus over 130 drill problems with answers extend these principles. A wide variety of problems, all new to this edition -- including realistic applications, computer-based problems, and design problems. Coverage of current topics of interest, such as fiber optics, spread spectrum systems and Integrated Digital Services Networks.