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Since it was first published in 1995, Photonic Crystals has remained the definitive text for both undergraduates and researchers on

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photonic band-gap materials and their use in controlling the propagation of light. This newly expanded and revised edition covers the latest developments in the field, providing the most up-to-date, concise, and comprehensive

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book available on these novel materials and their applications.

Starting from Maxwell's equations and Fourier analysis, the authors develop the theoretical tools of photonics using principles of linear algebra and

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symmetry,
emphasizing
analogies with
traditional solid-
state physics and
quantum theory.
They then
investigate the
unique phenomena
that take place
within photonic
crystals at defect
sites and surfaces,

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from one to three dimensions. This new edition includes entirely new chapters describing important hybrid structures that use band gaps or periodicity only in some directions: periodic waveguides, photonic-crystal

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slabs, and photonic-crystal fibers. The authors demonstrate how the capabilities of photonic crystals to localize light can be put to work in devices such as filters and splitters. A new appendix provides an overview of

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computational
methods for
electromagnetism.
Existing chapters
have been
considerably
updated and
expanded to include
many new three-
dimensional
photonic crystals, an
extensive tutorial on
device design using

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temporal coupled-mode theory, discussions of diffraction and refraction at crystal interfaces, and more. Richly illustrated and accessibly written, Photonic Crystals is an indispensable resource for students and

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researchers.

Extensively revised

and expanded

Features improved

graphics throughout

Includes new

chapters on

photonic-crystal

fibers and combined

index-and band-gap-

guiding Provides an

introduction to

coupled-mode

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theory as a powerful tool for device design Covers many new topics, including omnidirectional reflection, anomalous refraction and diffraction, computational photonics, and much more.

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This new resource presents the concepts, technologies, and design techniques for devices based on the electro-optic effect in lithium niobate. It bridges from the theory of photonics and electro-optics, to the practice of electro-

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optic device design
and application.

There is an
emphasis on
practical analysis
using modern
modeling tools. The
book explains the
fundamental physics
of the electro-optic
effect, classes of
electro-optic
materials, electro-

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optic properties of lithium niobate, and the physics and uses of ferroelectric domain inversion.

Readers are also provided with the principles of operation,

performance measures, and design

considerations for

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the most common types of electro-optic devices: beam deflectors, intensity and phase modulators, including quasi-phased matched devices.

This book provides an overview of research achievements by

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industry experts and academic scientists in the subject area of Optoelectronics Technology and Industry. It covers a broad field ranging from Laser Technology and Applications, Optical Communications, Optoelectronic Devices and

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Integration, Energy
Harvesting, to
Medical and
Biological
Applications.

Authored by highly-
regarded
researchers,
contributing a
wealth of knowledge
on Photonics and
Optoelectronics, this
comprehensive

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collection of papers offers insight into innovative technologies, recent advances and future trends needed to develop effective research and manage projects. Researchers will benefit considerably when applying the technical

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information covered
in this book.

Designed for senior
undergraduate/first
year graduate
students in electrical
engineering
departments, this
text covers key
subjects in optical
electronics and their
applications in
modern optical

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communications

where optical waves
are used as carriers
of information.

Electromagnetic
Waves, Materials,
and Computation
with MATLAB

Introduction to
Nanophotonics

Photonic Crystals

Fiber Optics

A Tutorial Memoir

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Lithium Niobate

Photonics

This hands-on introduction to silicon photonics engineering equips students with everything they need to begin creating foundry-ready designs. Nanometre sized structures made of semiconductors,

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**insulators, and
metals and grown
by modern growth
technologies or by
chemical synthesis
exhibit novel
electronic and
optical phenomena
due to the
confinement of
electrons and
photons. Strong
interactions
between electrons**

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and photons in narrow regions lead to inhibited spontaneous emission, thresholdless laser operation, and Bose-Einstein condensation of exciton-polaritons in microcavities. Generation of sub-wavelength radiation by

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**surface plasmon-
polaritons at metal-
semiconductor
interfaces,
creation of
photonic band
gaps in dielectrics,
and realization of
nanometer sized
semiconductor or
insulator
structures with
negative
permittivity and**

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permeability, known as metamaterials, are further examples in the area of Nanophotonics. The studies help develop spasers and plasmonic nanolasers of subwavelength dimensions, paving the way to use plasmonics in

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**future data centres
and high-speed
computers working
at THz bandwidth
with less than a
few fJ/bit
dissipation. The
present book is
aimed at graduate
students and
researchers
providing them
with an
introductory**

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**textbook on
Semiconductor
Nanophotonics. It
gives an
introduction to
electron-photon
interactions in
Quantum Wells,
Wires, and Dots
and then discusses
the processes in
microcavities,
photonic band gap
materials,**

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metamaterials, and related applications. The phenomena and device applications under strong light-matter interactions are discussed, mostly by using classical and semi-classical theories. Numerous examples and problems

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accompany each chapter.

The focus of this book lies at the meeting point of electromagnetic waveguides and photonic crystals. Although these are both widely studied topics, they have been kept apart until recently. The

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purpose of the first edition of this book was to give state-of-the-art theoretical and numerical viewpoints about exotic fibres which use “photonic crystal effects” and consequently exhibit some remarkable properties. Since

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that first edition, photonic crystal fibres have become an important and effective optical device. In this second edition, the description of the theoretical and numerical tools used to study these fibres is enhanced, whilst

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**up-to-date
information about
the properties,
applications and
fabrication of
these fibres is
added./a
Find out
everything you
need to know
about how current
networks will have
to evolve to
provide for future**

broadband services In this book, the authors provide an overview of the status, challenges, architectures, and technological solutions for core and metropolitan networks. Furthermore, the book describes the current state of

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core and metropolitan telecommunication networks, as well as the drivers and motives behind the current paradigm shift in the telecommunications industry.

Moreover, the authors elaborate system design guidelines for both

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point-to-point and multi-hop optical networks taking into consideration the analogue nature of the transmission channel. Key Features: Provides coverage of all aspects of core and metro networks supporting future

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**broadband
services, and a
detailed
description of the
state-of-the-art
Presents a clear
path for migrating
from point-to-point
to data-centric,
dynamic, multi-hop
optical networks
Shows how current
systems will need
to evolve over the**

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**coming years,
summarizing
challenges and
issues to be
investigated in
future research
Covers a wide
range of topics
from network
architectures, to
control plane, to
key optical and
optoelectronic
devices, and best**

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**practice in
transmission and
system design
Provides results,
best practices and
guidelines for
various technical
problems,
including
numerous hands-
on examples
Written by authors
from cutting-edge
companies such as**

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**Alcatel-Lucent,
Siemens, Lucent,
France Telecom,
BT, and Telefonica
Optical Core and
Metro Networks
will be of interest
to researchers in
industry and
academia, and
advanced (final
year
undergraduate)
and postgraduate**

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students

undertaking

communications,

networking and

optics courses.

Compendium On

Electromagnetic

Analysis - From

Electrostatics To

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Fundamentals And

Applications For

Physicists And

Engineers (In 5

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Volumes)

**Physics of Light
and Optics (Black
& White)**

**Photonics
Solutions Manual
for Optical
Electronics in
Modern
Communications
Second Edition
Linear and
Nonlinear
Interactions of**

Page 40/187

Laser Light and Matter

**Photonic devices lie
at the heart of the
communications
revolution, and
have become a
large and
important part of
the electronic
engineering field,
so much so that**

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**many colleges now
treat this as a
subject in its own
right. With this in
mind, the author
has put together a
unique textbook
covering every
major photonic
device, and striking
a careful balance
between theoretical**

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**and practical
concepts. The book
assumes a basic
knowledge of
optics,
semiconductors
and
electromagnetic
waves. Many of the
key background
concepts are
reviewed in the**

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first chapter.

Devices covered include optical fibers, couplers, electro-optic devices, magneto-optic devices, lasers and photodetectors. Problems are included at the end of each chapter and a solutions set is

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available. The book is ideal for senior undergraduate and graduate courses, but being device driven it is also an excellent engineers' reference.

This volume contains papers presented at the NATO Advanced

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**Study Institute
(ASI) Photonic
Crystals and Light
Localization held at
the Creta Maris
Hotel in Limin
Hersonissou, Crete,
June 18-30, 2000.
Photonic crystals
offer unique ways
to tailor light and
the propagation of**

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electromagnetic waves (EM). In analogy to electrons in a crystal, EM waves propagating in a structure with a periodically modulated dielectric constant are organized into photonic bands, separated by gaps

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where propagating states are forbidden. There have been proposals for novel applications of these photonic band gap (PBG) crystals, with operating frequencies ranging from microwave to the optical regime,

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**that include zero
threshold lasers,
low-loss resonators
and cavities, and
efficient microwave
antennas.**

**Spontaneous
emission,
suppressed for
photons in the
photonic band gap,
offers novel**

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**approaches to
manipulate the EM
field and create
high-efficiency light-
emitting structures.
Innovative ways to
manipulate light
can have a
profound influence
on science and
technology.**

Fundamentals of

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Nonlinear Optics

**encompasses a
broad spectrum of
nonlinear
phenomena from
second-harmonic
generation to
soliton formation.**

**The wide use of
nonlinear optical
phenomena in
laboratories and**

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commercial devices requires familiarity with the underlying physics as well as practical device considerations.

This text adopts a combined approach to analyze the complimentary aspects of nonlinear optics, enabling a

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**fundamental
understanding of
both a given effect
and practical
device applications.
After a review
chapter on linear
phenomena
important to
nonlinear optics,
the book tackles
nonlinear**

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**phenomena with a
look at the
technologically
important
processes of second-
harmonic
generation, sum-
frequency and diffe-
rence-frequency
generation, and the
electro-optic effect.
The author covers**

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these processes in considerable detail at both theoretical and practical levels as the formalisms developed for these effects carry to subsequent topics, such as four-wave mixing, self-phase modulation, Raman scattering,

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Brillouin

**scattering, and
soliton formation.**

**Consistently
connecting theory,
process, effects, and
applications, this
introductory text
encourages
students to master
key concepts and to
solve nonlinear**

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optics problems—preparing them for more advanced study. Along with extensive problems at the end of each chapter, it presents general algorithms accessible to any scientific graphical and programming package. Watch the

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**author speak about
the book.**

**Application of
Optical Fiber in
Engineering
chronicles the
recent progress in
the research and
development of
optical fiber
technology and
examines present**

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and future

**opportunities by
presenting the
latest advances on
key topics such as
birefringence and
polarization mode
dispersion
characteristics,
quantum
communication,
polymer optical**

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**fiber grating,
optical fiber
sensing devices and
the Raman fiber
laser. All the
contributing
authors are experts
in the field, and this
book contains their
latest research.
This book will
provide an**

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**invaluable source
for researchers,
engineers, and
advanced students
in the field of
optical fibers,
photonics,
optoelectronics,
fiber lasers, and
sensors.**

**Molding the Flow
of Light - Second**

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Edition

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Nanophotonics
Matrix, Numerical,
and Optimization
Methods in Science
and Engineering
Quantum
Electronics
Computational
Photonics
Our Changing**

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Views of Photons

Deals with the fundamental properties of photon and light beams, both experimentally and theoretically. It covers the essentials of linear interactions and most of the nonlinear interactions between light and matter in both the transparent and absorbing cases.

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About 4000 references open access to original literature.

Silicon photonics is beginning to play an important role in driving innovations in communication and computation for an increasing number of applications, from health care and biomedical sensors to

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autonomous driving, datacenter networking, and security. In recent years, there has been a significant amount of effort in industry and academia to innovate, design, develop, analyze, optimize, and fabricate systems employing silicon photonics, shaping

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the future of not only
Datacom and telecom
technology but also
high-performance
computing and
emerging computing
paradigms, such as
optical computing and
artificial intelligence.
Different from existing
books in this area,
Silicon Photonics for
High-Performance
Computing and

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Beyond presents a comprehensive overview of the current state-of-the-art technology and research achievements in applying silicon photonics for communication and computation. It focuses on various design, development, and integration

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challenges, reviews
the latest advances
spanning materials,
devices, circuits,
systems, and
applications.

Technical topics
discussed in the book
include: •

Requirements and the
latest advances in
high-performance
computing systems •

Device- and system-

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level challenges and latest improvements to deploy silicon photonics in computing systems • Novel design solutions and design automation techniques for silicon photonic integrated circuits • Novel materials, devices, and photonic integrated circuits on

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silicon • Emerging
computing
technologies and
applications based on
silicon photonics
Silicon Photonics for
High-Performance
Computing and
Beyond presents a
compilation of 19
outstanding
contributions from
academic and
industry pioneers in

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the field. The selected contributions present insightful discussions and innovative approaches to understand current and future bottlenecks in high-performance computing systems and traditional computing platforms, and the promise of silicon photonics to address those

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challenges. It is ideal for researchers and engineers working in the photonics, electrical, and computer engineering industries as well as academic researchers and graduate students (M.S. and Ph.D.) in computer science and engineering, electronic and

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electrical engineering,
applied physics,
photonics, and optics.

With this self-

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comprehensive text,

students will gain a

detailed

understanding of the

fundamental concepts

and major principles

of photonics.

Assuming only a

basic background in

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optics, readers are guided through key topics such as the nature of optical fields, the properties of optical materials, and the principles of major photonic functions regarding the generation, propagation, coupling, interference, amplification, modulation, and

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detection of optical waves or signals. Numerous examples and problems are provided throughout to enhance understanding, and a solutions manual containing detailed solutions and explanations is available online for instructors. This is the ideal resource for

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electrical engineering
and physics
undergraduates
taking introductory,
single-semester or
single-quarter courses
in photonics,
providing them with
the knowledge and
skills needed to
progress to more
advanced courses on
photonic devices,
systems and

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applications.

Nano-Optics: Fundamentals, Experimental Methods, and Applications offers insights into the fundamentals and industrial applications of nanoscale light-emitting materials and their composites. This book serves as a reference, offering an

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overview of existing research, with a particular focus on industrial applications.

Nano-optics is the branch of nanoscience and nanotechnology that deals with interaction of light with nanoscale objects. This book explores the materials, structure, manufacturing

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techniques, and industrial applications of nano-optics. The applications discussed include healthcare, communication, astronomy, and satellites. Explains the major manufacturing techniques for light-emitting nanoscale materials Discusses how nanoscale optical

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materials are being
used in a range of
industrial applications
Assesses the
challenges of using
nano-optics in a mass-
production context
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Optical Electronics in
Modern
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Sixth Edition
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Fundamentals,
Materials,
Nanostructures,
LEDs, and Amplifiers,
Vol. 1
Nano-Optics
Optical Electronics in
Modern
Communications

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This Third Edition of the popular text, while retaining nearly all the material of the previous edition, incorporates material on important new developments in lasers and quantum electronics. Covers phase-conjugate optics and its myriad applications, the long wavelength quaternary

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semiconductor laser,
and our deepened
understanding of the
physics of
semiconductor
lasers--especially that
applying to their
current modulations
and limiting
bandwidth, laser arrays
and the related concept
of supermodes,
quantum well

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semiconductor lasers, the role of phase amplitude coupling in laser noise, and free-electron lasers. In addition, the chapters on laser noise and third-order nonlinear effects have been extensively revised.

The aim of this textbook is to provide an overview of

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nanophotonics, a discipline which was developed around the turn of the millennium. This unique and rapidly evolving subject area is the result of a collaboration between various scientific communities working on different aspects of light-matter interaction at the nanoscale. These

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include near-field optics and super-resolution microscopy, photonic crystals, diffractive optics, plasmonics, optoelectronics, synthesis of metallic and semiconductor nanoparticles, two-dimensional materials, and metamaterials. The book is aimed at

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graduate students with a background in physics, electrical engineering, material science, or chemistry, as well as lecturers and researchers working within these fields.

As optical technologies move closer to the core of modern computer architecture, there arise many challenges in

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building optical capabilities from the network to the motherboard. Rapid advances in integrated optics technologies are making this a reality.

However, no comprehensive, up-to-date reference is available to the technologies and principles underlying

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the field. The
Encyclopedic
Handbook of
Integrated Optics fills
this void, collecting the
work of 53 leading
experts into a
compilation of the
most important
concepts, phenomena,
technologies, and
terms covering all
related fields. This

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unique book consists of two types of entries: the first is a detailed, full-length description; the other, a concise overview of the topic. Additionally, the coverage can be divided into four broad areas: A survey of the basics of integrated optics, exploring theory, practical

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concerns, and the fundamentals behind optical devices Focused discussion on devices and components such as arrayed waveguide grating, various types of lasers, optical amplifiers, and optoelectronic devices In-depth examination of subsystems including MEMS,

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optical pickup, and
planar lightwave
circuits Finally, systems
considerations such as
multiplexing,
demultiplexing, 3R
circuits, transmission,
and reception Offering
a broad and complete
treatment of the field,
the Encyclopedic
Handbook of
Integrated Optics is the

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complete guide to the fundamentals, principles, and applications of integrated optics technology.

The five-volume set may serve as a comprehensive reference on electromagnetic analysis and its applications at all

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frequencies, from static fields to optics and photonics. The material includes micro- and nanomagnetics, the new generation of electric machines, renewable energy, hybrid vehicles, low-noise motors; antennas and microwave devices, plasmonics,

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metamaterials, lasers,
and more. Written at a
level accessible to both
graduate students and
engineers,
Electromagnetic
Analysis is a
comprehensive
reference, covering
methods and
applications at all
frequencies (from
statics to optical). Each

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volume contains
pedagogical/tutorial
material of high
archival value as well as
chapters on state-of-
the-art developments.
Application of Optical
Fiber in Engineering
Handbook of
Optoelectronic Device
Modeling and
Simulation
Physics of Photonic

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Devices

Stability, Instability and
Chaos

Crystal Nonlinear
Optics

Photonic Devices

***Address vector and
matrix methods
necessary in
numerical methods
and optimization of
linear systems in
engineering with***

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this unified text.

Treats the mathematical models that describe and predict the evolution of our processes and systems, and the numerical methods required to obtain approximate solutions. Explores the dynamical systems theory

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used to describe and characterize system behaviour, alongside the techniques used to optimize their performance. Integrates and unifies matrix and eigenfunction methods with their applications in numerical and optimization

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methods.

***Consolidating,
generalizing, and
unifying these
topics into a single
coherent subject,
this practical
resource is suitable
for advanced
undergraduate
students and
graduate students in
engineering,
physical sciences,***

***and applied
mathematics.***

***In the thirty-seven
years that have
gone by since the
first volume of
Progress in Optics
was published,
optics has become
one of the most
dynamic fields of
science. At the time
of inception of this
series, the first***

lasers were only just becoming operational, holography was in its infancy, subjects such as fiber optics, integrated optics and optoelectronics did not exist and quantum optics was the domain of only a few physicists. The term photonics had not yet been coined.

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Today these fields are flourishing and have become areas of specialisation for many science and engineering students and numerous research workers and engineers throughout the world. Some of the advances in these fields have been

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***recognized by
awarding Nobel
prizes to seven
physicists in the last
twenty years. The
volumes in this
series which have
appeared up to now
contain nearly 190
review articles by
distinguished
research workers,
which have become
permanent records***

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for many important developments. They have helped optical scientists and optical engineers to stay abreast of their fields. There is no sign that developments in optics are slowing down or becoming less interesting. - Gaussian apodization and

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***beam propagation -
Electromagnetically-
induced
transparency - Three-
dimensional
electromagnetic
fields - Quantum
cryptography -
Optical quantum
cloning
Readily available
commercial
software enables
engineers and***

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students to perform routine calculations and design without necessarily having a sufficient conceptual understanding of the anticipated solution. The software is so user-friendly that it usually produces a beautiful colored visualization of that

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***solution, often
camouflaging the
fact that t
Quantum Aspects of
Light Propagation
provides an
overview of spatio-
temporal
descriptions of the
electromagnetic
field in linear and
nonlinear dielectric
media, appropriate
to macroscopic and***

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microscopic theories. Readers will find an introduction to canonical quantum descriptions of light propagation in a nonlinear dispersionless dielectric medium, and an approach to linear and nonlinear dispersive dielectric media. Illustrated by

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optical processes, these descriptions are simplified by a transition to one-dimensional propagation.

Quantum theories of light propagation in optical media are generalized from dielectric media to magnetodielectrics, in addition to a presentation of

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***classical and
nonclassical
properties of
radiation
propagating through
negative-index
media. Valuable
analyses of
quantization in
waveguides,
photonic crystals,
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with wave modes that
become photons,
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