

1. Record Nr.	UNINA9910814790803321
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Titolo	Fiber optic communications : fundamentals and applications // Shiva Kumar and M. Jamal Deen
Pubbl/distr/stampa	Chichester, [England] : , : Wiley, , 2014 ©2014
ISBN	1-118-68343-9 1-118-68420-6
Descrizione fisica	1 online resource (573 p.)
Classificazione	TEC030000
Disciplina	621.36/92
Soggetti	Optical fiber communication Fiber optics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Cover; Title Page; Copyright; Contents; Preface; Acknowledgments; Chapter 1 Electromagnetics and Optics; 1.1 Introduction; 1.2 Coulomb's Law and Electric Field Intensity; 1.3 Ampere's Law and Magnetic Field Intensity; 1.4 Faraday's Law; 1.4.1 Meaning of Curl; 1.4.2 Ampere's Law in Differential Form; 1.5 Maxwell's Equations; 1.5.1 Maxwell's Equation in a Source-Free Region; 1.5.2 Electromagnetic Wave; 1.5.3 Free-Space Propagation; 1.5.4 Propagation in a Dielectric Medium; 1.6 1-Dimensional Wave Equation; 1.6.1 1-Dimensional Plane Wave; 1.6.2 Complex Notation; 1.7 Power Flow and Poynting Vector 1.8 3-Dimensional Wave Equation 1.9 Reflection and Refraction; 1.9.1 Refraction; 1.10 Phase Velocity and Group Velocity; 1.11 Polarization of Light; Exercises; Further Reading; References; Chapter 2 Optical Fiber Transmission; 2.1 Introduction; 2.2 Fiber Structure; 2.3 Ray Propagation in Fibers; 2.3.1 Numerical Aperture; 2.3.2 Multi-Mode and Single-Mode Fibers; 2.3.3 Dispersion in Multi-Mode Fibers; 2.3.4 Graded-Index Multi-Mode Fibers; 2.4 Modes of a Step-Index Optical Fiber*; 2.4.1 Guided Modes; 2.4.2 Mode Cutoff; 2.4.3 Effective Index; 2.4.4 2-Dimensional Planar Waveguide Analogy 2.4.5 Radiation Modes 2.4.6 Excitation of Guided Modes; 2.5 Pulse Propagation in Single-Mode Fibers; 2.5.1 Power and the dBm Unit; 2.6

Comparison between Multi-Mode and Single-Mode Fibers; 2.7 Single-Mode Fiber Design Considerations; 2.7.1 Cutoff Wavelength; 2.7.2 Fiber Loss; 2.7.3 Fiber Dispersion; 2.7.4 Dispersion Slope; 2.7.5 Polarization Mode Dispersion; 2.7.6 Spot Size; 2.8 Dispersion-Compensating Fibers (DCFs); 2.9 Additional Examples; Exercises; Further Reading; References; Chapter 3 Lasers; 3.1 Introduction; 3.2 Basic Concepts; 3.3 Conditions for Laser Oscillations; 3.4 Laser Examples 3.4.1 Ruby Laser 3.4.2 Semiconductor Lasers; 3.5 Wave-Particle Duality; 3.6 Laser Rate Equations; 3.7 Review of Semiconductor Physics; 3.7.1 The PN Junctions; 3.7.2 Spontaneous and Stimulated Emission at the PN Junction; 3.7.3 Direct and Indirect Band-Gap Semiconductors; 3.8 Semiconductor Laser Diode; 3.8.1 Heterojunction Lasers; 3.8.2 Radiative and Non-Radiative Recombination; 3.8.3 Laser Rate Equations; 3.8.4 Steady-State Solutions of Rate Equations; 3.8.5 Distributed-Feedback Lasers; 3.9 Additional Examples; Exercises; Further Reading; References

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Sommario/riassunto

Fiber-optic communication systems have advanced dramatically over the last four decades, since the era of copper cables, resulting in low-cost and high-bandwidth transmission. Fiber optics is now the backbone of the internet and long-distance telecommunication. Without it we would not enjoy the benefits of high-speed internet, or low-rate international telephone calls. This book introduces the basic concepts of fiber-optic communication in a pedagogical way. The important mathematical results are derived by first principles rather than citing research articles. In addition, physical i
