

Electromagnetic Fields And Waves Dover Books On Physics

This book focuses primarily on senior undergraduates and graduates in Electromagnetics Waves and Materials courses. The book takes an integrative approach to the subject of electromagnetics by supplementing quintessential "old school" information and methods with instruction in the use of new commercial software such as MATLAB. Homework problems, PowerPoint slides, an instructor's manual, a solutions manual, MATLAB downloads, quizzes, and suggested examination problems are included. Revised throughout, this new edition includes two key new chapters on artificial electromagnetic materials and electromagnetics of moving media.

This excellent text covers a year's course. Topics include vectors D and H inside matter, conservation laws for energy, momentum, invariance, form invariance, covariance in special relativity, and more.

The aim of this book is to interpret all the laws of classical electromagnetism in a modern coherent way. In a typical undergraduate course using vector analysis, the students finally end up with Maxwell's equations, when they are often exhausted after a very long course, in which full discussions are properly given of the full range of applications of individual laws, each of which is important in its own right. As a result, many students do not appreciate how limited is the experimental evidence on the basis of which Maxwell's equations are normally developed and they do not always appreciate the underlying unity of classical electromagnetism, before they go on to graduate courses in which Maxwell's equations are taken as axiomatic. This book is designed to be used between such an undergraduate course and graduate courses. It is written by an experimental physicist and is intended to be used by physicists, electrical engineers and applied mathematicians.

This text applies engineering science and technology to biological cells and tissues that are electrically conducting and excitable. It describes the theory and a wide range of applications in both electric and magnetic fields.

The story of two brilliant nineteenth-century scientists who discovered the electromagnetic field, laying the groundwork for the amazing technological and theoretical breakthroughs of the twentieth century. Two of the boldest and most creative scientists of all time were Michael Faraday (1791-1867) and James Clerk Maxwell (1831-1879). This is the story of how these two men - separated in age by forty years - discovered the existence of the electromagnetic field and devised a radically new theory which overturned the strictly mechanical view of the world that had prevailed since Newton's time. The authors, veteran science writers with special expertise in physics and engineering, have created a lively narrative that interweaves rich biographical detail from each man's life with clear explanations of their scientific accomplishments. Faraday was an autodidact, who overcame class prejudice and a lack of mathematical training to become renowned for his acute powers of experimental observation, technological skills, and prodigious scientific imagination. James Clerk Maxwell was highly regarded as one of the most brilliant mathematical physicists of the age. He made an enormous number of advances in his own right. But when he translated Faraday's ideas into mathematical language, thus creating field theory, this unified framework of electricity, magnetism and light became the basis for much of later, 20th-century physics. Faraday's and Maxwell's collaborative efforts gave rise to many of the technological innovations we take for granted today - from electric power generation to television, and much more. Told with panache, warmth, and clarity, this captivating story of their greatest work - in which each played an equal part - and their inspiring lives will bring new appreciation to these giants of science.

This book is unique because unlike others on the subject that focus on mathematical arguments, this volume emphasizes the original field concept, aiming at objectives in modern information technology. Written primarily for undergraduate students of physics and engineering, this book serves as a useful reference for graduate students and researchers too. With concise introductory arguments for the physics of electromagnetism, this book covers basic topics including the nature of space-time-dependent radiations in modern applications.

Comprehensive undergraduate text covers basics of electric and magnetic fields, building up to electromagnetic theory. Related topics include relativity theory. Over 900 problems, some with solutions. 1975 edition.

Written to complement course textbooks, this book focuses on the topics that undergraduates in physics and engineering find most difficult.

Interfacing physics and electrical engineering, this graduate-level text reveals the inherent simplicity of the basic ideas of electromagnetic wave propagation and antennas and their logical development from Maxwell field equations. Topics include radiation from monochromatic sources in unbounded regions, electromagnetic waves in a plasma medium, Doppler effect, much more. 1965 edition.

A basic introduction to electromagnetism, supplying the fundamentals of electrostatics and magnetostatics, in addition to a thorough investigation of electromagnetic theory. Numerous problems and references. Calculus and differential equations required. 1947 edition.

This book is a rigorous but concise macroscopic description of the interaction between electromagnetic radiation and structures containing graphene sheets (two-dimensional structures). It presents canonical problems with translational invariant geometries, in which the solution of the original vectorial problem can be reduced to the treatment of two scalar problems, corresponding to two basic polarization modes. The book includes computational problems and makes use of the Python programming language to make numerical calculations accessible to any science student. Many figures within are accompanied by Python scripts.

One of the most methodical treatments of electromagnetic wave propagation, radiation, and scattering—including new applications and ideas Presented in two parts, this book takes an

analytical approach on the subject and emphasizes new ideas and applications used today. Part one covers fundamentals of electromagnetic wave propagation, radiation, and scattering. It provides ample end-of-chapter problems and offers a 90-page solution manual to help readers check and comprehend their work. The second part of the book explores up-to-date applications of electromagnetic waves—including radiometry, geophysical remote sensing and imaging, and biomedical and signal processing applications. Written by a world renowned authority in the field of electromagnetic research, this new edition of *Electromagnetic Wave Propagation, Radiation, and Scattering: From Fundamentals to Applications* presents detailed applications with useful appendices, including mathematical formulas, Airy function, Abel's equation, Hilbert transform, and Riemann surfaces. The book also features newly revised material that focuses on the following topics: Statistical wave theories—which have been extensively applied to topics such as geophysical remote sensing, bio-electromagnetics, bio-optics, and bio-ultrasound imaging Integration of several distinct yet related disciplines, such as statistical wave theories, communications, signal processing, and time reversal imaging New phenomena of multiple scattering, such as coherent scattering and memory effects Multiphysics applications that combine theories for different physical phenomena, such as seismic coda waves, stochastic wave theory, heat diffusion, and temperature rise in biological and other media Metamaterials and solitons in optical fibers, nonlinear phenomena, and porous media Primarily a textbook for graduate courses in electrical engineering, *Electromagnetic Wave Propagation, Radiation, and Scattering* is also ideal for graduate students in bioengineering, geophysics, ocean engineering, and geophysical remote sensing. The book is also a useful reference for engineers and scientists working in fields such as geophysical remote sensing, bio-medical engineering in optics and ultrasound, and new materials and integration with signal processing.

A revision of the defining book covering the physics and classical mathematics necessary to understand electromagnetic fields in materials and at surfaces and interfaces. The third edition has been revised to address the changes in emphasis and applications that have occurred in the past twenty years.

Self-contained treatment examines operational definition of charge and current; specification of arbitrary distributions of charge and current; definition of electromagnetic field and effect on general charge distributions; electric field produced by static charges; magnetic induction field produced by steady currents; Maxwell's equations in vacuum; much more. 1981 edition.

A complete basic undergraduate course in modern optics for students in physics, technology, and engineering. The first half deals with classical physical optics; the second, quantum nature of light. Solutions.

This book consists of two parts. Part A (Chapters 1-3) is an introduction to the physics of conducting solids, while Part B (Chapters 4-10) is an introduction to the theory of electromagnetic fields and waves. The book is intended to introduce the student to classical electrodynamics and, at the same time, to explain in simple terms the quantum theory of conducting substances – in particular, the solid ones. Excessive mathematical proof is avoided as much as possible, in favor of pedagogical efficiency at an introductory level. The theory of vector fields is briefly discussed in a separate chapter, helping the student cope with the mathematical challenges of Maxwell's theory. The book serves as a primary source for a sophomore-level electromagnetics course in an electronics-oriented engineering program, but it can also be used as a secondary (tutorial) source for an intermediate-level course in electrodynamics for physicists and engineers. The content is based on the author's lecture notes for his sophomore-level Physics course at the Hellenic Naval Academy.

The *Theory of the Electromagnetism* covers the behavior of electromagnetic fields and those parts of applied mathematics necessary to discover this behavior. This book is composed of 11 chapters that emphasize the Maxwell's equations. The first chapter is concerned with the general properties of solutions of Maxwell's equations in matter, which has certain macroscopic properties. The succeeding chapters consider specific problems in electromagnetism, including the determination of the field produced by a variable charge, first in isolation and then in the surface distributions of an antenna. The next two chapters are concerned with the effects of surrounding the medium by a perfectly conducting boundary as in a cavity resonator and as in a waveguide. Other chapters are devoted to discussions on the effect of a plane interface where the properties of the medium change discontinuously; the propagation along cylindrical surfaces; the study of the waves scattered by objects both with and without edges. This book further reviews the harmonic waves and the difficulties involved in going from harmonic waves to those with a more general time dependence. The final chapter provides some information about the classical theory of electrons, magneto-hydrodynamics and waves in a plasma. This book will prove useful to physicists, and physics teachers and students.

Nobel Laureate discusses quantum theory, uncertainty, wave mechanics, work of Dirac, Schroedinger, Compton, Einstein, others. "An authoritative statement of Heisenberg's views on this aspect of the quantum theory." — *Nature*.

Clear, coherent work for graduate-level study discusses the Maxwell field equations, radiation from wire antennas, wave aspects of radio-astronomical antenna theory, the Doppler effect, and more.

Comprehensive graduate-level text by a distinguished theoretical physicist reveals the classical underpinnings of modern quantum field theory. Topics include space-time, Lorentz transformations, conservation laws, equations of motion, Green's functions, and more. 1964 edition.

This text advances from the basic laws of electricity and magnetism to classical electromagnetism in a quantum world. The treatment focuses on core concepts and related aspects of math and physics. 2016 edition.

This text provides a mathematically precise but intuitive introduction to classical electromagnetic theory and wave propagation, with a brief introduction to special relativity. While written in a distinctive, modern style, Friedrichs manages to convey the physical intuition and 19th century basis of the equations, with an emphasis on conservation laws. Particularly striking features of the book include: (a) a mathematically rigorous derivation of the interaction of electromagnetic waves with matter, (b) a straightforward explanation of how to use variational principles to solve

problems in electro- and magnetostatics, and (c) a thorough discussion of the central importance of the conservation of charge. It is suitable for advanced undergraduate students in mathematics and physics with a background in advanced calculus and linear algebra, as well as mechanics and electromagnetics at an undergraduate level. Apart from minor corrections to the text, the notation was updated in this edition to follow the conventions of modern vector calculus. Titles in this series are co-published with the Courant Institute of Mathematical Sciences at New York University.

This classic sets forth the fundamentals of thermodynamics and kinetic theory simply enough to be understood by beginners, yet with enough subtlety to appeal to more advanced readers, too.

Direct approach covers electrostatics of point charges, distributions of charge, conductors and dielectrics, currents and circuits, Lorentz force and magnetic field, magnetic media, Maxwell equations, more. 228 illustrations. 1963 edition.

This edition aims to expand on the first edition and take the reader through to the wave equation on coaxial cable and free-space by using Maxwell's equations. The new chapters include time varying signals and fundamentals of Maxwell's equations. This book will introduce and discuss electromagnetic fields in an accessible manner. The author explains electroconductive fields and develops ideas relating to signal propagation and develops Maxwell's equations and applies them to propagation in a planar optical waveguide. The first of the new chapters introduces the idea of a travelling wave by considering the variation of voltage along a coaxial line. This concept will be used in the second new chapter which solves Maxwell's equations in free-space and then applies them to a planar optical waveguide in the third new chapter. As this is an area that most students find difficult, it links back to the earlier chapters to aid understanding. This book is intended for first- and second-year electrical and electronic undergraduates and can also be used for undergraduates in mechanical engineering, computing and physics. The book includes examples and homework problems. Introduces and examines electrostatic fields in an accessible manner Explains electroconductive fields Develops ideas relating to signal propagation Examines Maxwell's equations and relates them to propagation in a planar optical waveguide Martin Sibley recently retired after 33 years of teaching at the University of Huddersfield. He has a PhD from Huddersfield Polytechnic in Preamplifier Design for Optical Receivers. He started his career in academia in 1986 having spent 3 years as a postgraduate student and then 2 years as a British Telecom-funded research fellow. His research work had a strong bias to the practical implementation of research, and he taught electromagnetism and communications at all levels since 1986. Dr. Sibley finished his academic career as a Reader in Communications, School of Computing and Engineering, University of Huddersfield. He has authored five books and published over 80 research papers.

Newly corrected, this edition of a highly acclaimed text is suitable for advanced physics courses. Its accessible macroscopic view of classical electromagnetics emphasizes integrating electromagnetic theory with physical optics. 1994 edition.

The 1988 Nobel Prize winner establishes the subject's mathematical background, reviews the principles of electrostatics, then introduces Einstein's special theory of relativity and applies it to topics throughout the book.

Electrodynamics involves the study of electric charges and their interaction with magnetic and electric fields. This advanced undergraduate text presupposes some knowledge of electricity and magnetism, making substantial use of vector analysis. The authors define their goal as "a serious attempt to develop electrodynamics on a postulational basis and to define each concept in the most general way." 1960 edition.

Electromagnetic Fields and Waves Courier Corporation

Newly corrected, this highly acclaimed text is suitable for advanced physics courses. The authors present a very accessible macroscopic view of classical electromagnetics that emphasizes integrating electromagnetic theory with physical optics. The survey follows the historical development of physics, culminating in the use of four-vector relativity to fully integrate electricity with magnetism. Corrected and emended reprint of the Brooks/Cole Thomson Learning, 1994, third edition.

Covers vectors, stationary electric charges, direct currents, dielectrics, magnetic fields, alternating currents, and electromagnetic waves

Ideal as a classroom text or for individual study, this unique one-volume overview of classical wave theory covers wave phenomena of acoustics, optics, electromagnetic radiations, and more.

Compact and precise coverage of the electrostatic field in vacuum; general methods for solution of potential problems; radiation reaction and covariant formulation of conservation laws of electrodynamics; much more. 1962 edition.

This comprehensive introduction to classical electromagnetic theory covers the major aspects, including scalar fields, vectors, laws of Ohm, Joule, Coulomb, Faraday, Maxwell's equation, and more. With numerous diagrams and illustrations.

[Copyright: b897aeef96537c62099b5848a0498b78](https://www.doverpublications.com/9780486119141)