

## Textbook Contents Electromagnetic Field Theory A

"This is a concise, beginning graduate-level textbook on classical electromagnetism, the branch of physics that describes the interaction of electric currents or fields and magnetic fields. Electromagnetism (also called electrodynamics) is one of the pillars of modern physics and, as such, of the modern physics curriculum, with courses on electromagnetism required at the undergraduate and graduate levels. These courses traditionally proceed in a quasi-historical fashion, starting from equations and laws that were first formulated in the eighteenth and nineteenth centuries and still form the foundations of our understanding of electromagnetism. However, as Robert Wald argues, teaching in this way can be imprecise and tends to promote outdated ways of thinking about the subject. This book rethinks how electromagnetism is presented at the graduate level, offering a corrective that aims to bring teaching up to date with our more modern understanding of the topic. The book begins by debunking four common misconceptions, or "myths," that can hinder a deep conceptual understanding of electromagnetism. Wald then proceeds through the major topics first-year grad courses (and textbooks) in electromagnetism typically cover, including electrostatics, dielectrics, magnetostatics, electrodynamics, geometric optics, special relativity, gauge theory, and point charge. Wald's aim throughout is to explain to students how to think about electromagnetism from a modern and mathematically precise perspective, formulating all the key conceptual ideas and results in the field clearly and concisely, while forgoing extensive collections of examples and applications. The book could be used as the basis for or as a supplement to a course, or for self-study by students seeking a deeper understanding than traditional courses and books offer"--

Designed for upper division electromagnetism courses or as a reference for electrical engineers and scientists, this book introduces Maxwell's equations and electromagnetic waves as soon as possible (i.e., in the first third of the book), and then goes on to discuss electrostatics, magnetostatics, induction, etc., in the light of those equations. The book also provides a thorough discussion of vector field theory which emphasizes the rotational invariance of the dot and cross products, together with div, grad, and curl, and thus gives a clear physical motivation for the use of these constructs to describe electric and magnetic fields. Unlike many competing books, Maxwell's Equations & the Principles of Electromagnetism covers topics such as advanced potentials, retarded fields, forces on dielectric liquids, antenna theory, and Faraday rotations.

The study of electromagnetic field theory is required for proper understanding of every device wherein electricity is used for operation. The proposed textbook on electromagnetic fields covers all the generic and unconventional topics including electrostatic boundary value problems involving two- and three-dimensional Laplacian fields and one- and two- dimensional Poissonson fields, magnetostatic boundary value problems, eddy currents, and electromagnetic compatibility. The subject matter is supported by practical applications, illustrations to supplement the theory, solved numerical problems, solutions manual and Powerpoint slides including appendices and mathematical relations. Aimed at undergraduate, senior undergraduate students of electrical and electronics engineering, it. Presents fundamental concepts of electromagnetic fields in a simplified manner Covers one two- and three-dimensional electrostatic boundary value problems involving Laplacian fields and Poissonson fields Includes exclusive chapters on eddy currents and electromagnetic compatibility Discusses important aspects of magneto static boundary value problems Explores all the basic vector algebra and vector calculus along with couple of two- and three-dimensional problems

Electricity, Magnetism and Electromagnetic Theory has been designed to meet the needs of BSc (Physics) students as per the UGC Choice Based Credit System. This textbook provides a thorough understanding of the fundamental concepts of electricity, magnetism and electromagnetic theory. Having a problem-solving approach, it covers the entire spectrum of the subject with discussion on topics such as electrostatics, magnetostatics, electromagnetic induction, Maxwell's equations and electromagnetic wave propagation. The concepts are exhaustively presented with numerous examples and figures/diagrams which would help the students in analysing and retaining the concepts in an effective manner.

Electromagnetic Field Theories for Engineering
Electromagnetic Fields
A Collection of Problems
Principles of Electromagnetic Theory
Primary Theory of Electromagnetics
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.
Let us first state exactly what this book is and what it is not. It is a compendium of equations for the physicist and the engineer working with electrostatics, magneic tatics, electric currents, electromagnetic fields, heat flow, gravitation, diffusion, optics, or acoustics. It tabulates the properties of 40 coordinate systems, states the Laplace and Helmholtz equations in each coordinate system, and gives the separation equations and their solutions. But it is not a textbook and it does not cover relativistic and quantum phenomena. The history of classical physics may be regarded as an interplay between two ideas, the concept of action-at-a-distance and the concept of a field. Newton's equation of universal gravitation, for instance, implies action-at-a-distance. The same form of equation was employed by COULOMB to express the force between charged particles. AMPERE and GAUSS extended this idea to the phenomenological action between currents. In 1867, LUDVIG LORENZ formulated electrodynamics as retarded action-at-a-distance. At almost the same time, MAXWELL presented the alternative formulation in terms of fields. In most cases, the field approach has shown itself to be the more powerful.
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.
Electromagnetic Field Theory and Transmission Lines is ideal for a single semester, first course on Electromagnetic Field Theory (EMFT) at the undergraduate level. This book uses diagrammatic representations and real life examples to explain the fu
Field Theory of Guided Waves
Advanced Classical Electromagnetism
Theory and Computation of Electromagnetic Fields
Electromagnetic Field Theory for Engineers and Physicists
Electromagnetic Field Theory and Transmission Lines

Presents the basic concepts suitable for Engineering and Science Students. This text deals with the useful areas of vector analysis, basic principles of Electrostatics, Magnetostatics, Conduction of Current, Polarization in Dielectric material, Magnetic behavior in different materials and Different types of Capacitor & Inductance.

Perfect for the upper-level undergraduate physics student, Introduction to Electromagnetic Theory presents a complete account of classical electromagnetism with a modern perspective. Its focused approach delivers numerous problems of varying degrees of difficulty for continued study. The text gives special attention to concepts that are important for the development of modern physics, and discusses applications to other areas of physics wherever possible. A generous amount of detail has been given in mathematical manipulations, and vectors are employed right from the start.

The book Electromagnetic Field Theory caters to the students of BE/BTech Electronics and Communication Engineering, Electrical and Electronics Engineering, and Electronic Instrumentation Engineering, as electromagnetics is an integral part of their curricula. It covers a wide range of topics that deal with various physical and mathematical concepts, including vector functions, coordinate systems, integration and differentiation, complex numbers, and phasors. The book helps in understanding the electric and magnetic fields on different charge and current distributions, such as line, surface, and volume. It also explains the electromagnetic behaviour of waves, fields in transmission lines, and radiation in antennas. A number of electromagnetic applications are also included to develop the interest of students. SALIENT FEATURES
• Simple and easy-to-follow text
• Complete coverage of the subject as per the syllabi of most universities
• Lucid, well-explained concepts with clear examples
• Relevant illustrations for better understanding and retention
• Some of the illustrations provide three-dimensional view for in-depth knowledge
• Numerous mathematical examples for full clarity of concepts
• Chapter objectives at the beginning of each chapter for its overview
• Chapter-end summary and exercises for quick review and to test your knowledge

Discussed is the electromagnetic field theory and its mathematical methods. Maxwell's equations are presented and explained. It follows a detailed discussion of electrostatics, flux, magnetostatics, quasi stationary fields and electromagnetic fields. The author presents how to apply numerical methods like finite differences, finite elements, boundary elements, image charge methods, and Monte-Carlo methods to field theory problems. He offers an outlook on fundamental issues in physics including quantum mechanics. Some of these issues are still unanswered questions. A chapter dedicated to the theory of special relativity, which allows to simplify a number of field theory problems, complements this book. A book whose usefulness is not limited to engineering students, but can be very helpful for physicists and other branches of science.

Electromagnetic Fields (Theory and Problems)

A Modern Perspective

Including Coordinate Systems, Differential Equations and Their Solutions

Problem Book in Quantum Field Theory

Electromagnetism

A four year Electrical and Electronic engineering curriculum normally contains two modules of electromagnetic field theories during the first two years. However, some curricula do not have enough slots to accommodate the two modules. This book, Electromagnetic Field Theories, is designed for Electrical and Electronic engineering undergraduate students to provide fundamental knowledge of electromagnetic fields and waves in a structured manner. A comprehensive fundamental knowledge of electric and magnetic fields is required to understand the working principles of generators, motors and transformers. This knowledge is also necessary to analyze transmission lines, substitutions, insulator flashover mechanism, transient phenomena, etc. Recently, academics and researchers are working for sending electric power to a remote area by designing a suitable antenna. In this case, the knowledge of electromagnetic fields is considered as important tool.

"Co-published with Oxford University Press Long considered the most comprehensive account of electromagnetic theory and analytical methods for solving waveguide and cavity problems, this new Second Edition has been completely revised and thoroughly updated -- approximately 40% new material!Packed with examples and applications FIELD THEORY OF GUIDED WAVES provides solutions to a large number of practical structures of current interest. The book includes an exceptionally complete discussion of scalar and Dyadic Green Functions. Both a valuable review and source of basic information on applied mathematical topics and a hands-on source for solution methods and techniques, this book belongs on the desk of all engineers working in microwave and antenna systems!" Sponsored by: IEEE Antennas and Propagation Society

The study of classical electromagnetic fields is an adventure. The theory is complete mathematically and we are able to present it as an example of classical Newtonian experimental and mathematical philosophy. There is a set of foundational experiments, on which most of the theory is constructed. And then there is the bold theoretical proposal of a field-field interaction from James Clerk Maxwell. This textbook presents the theory of classical fields as a mathematical structure based solidly on laboratory experiments. Here the student is introduced to the beauty of classical field theory as a gen of theoretical physics. To keep the discussion fluid, the history is placed in a beginning chapter and some of the mathematical proofs in the appendices. Chapters on Green's Functions and Laplace's Equation and a discussion of Faraday's Experiment further deepen the understanding. The chapter on Einstein's relativity is an integral necessity to the text. Finally, chapters on particle motion and waves in a dispersive medium complete the picture. High quality diagrams and detailed end-of-chapter questions enhance the learning experience.

Engineers and scientists who develop and install electronic devices and circuits need to have a solid understanding of electromagnetic theory and the electromagnetic behavior of devices and circuits. In particular, they must be well-versed in electromagnetic compatibility, which minimizes and controls the side effects of interconnected electric dev

Electromagnetics for Electrical Machines

Electromagnetic Field Theory

Electromagnetic Field Theory and Wave Propagation

Teaching Electromagnetics

Electromagnetic Theory for Microwaves and Optoelectronics

This is a textbook on electromagnetics for undergraduate students in electrical engineering, information, and communications. The book contents are very compact and brief compared to other commonly known electromagnetic books for undergraduate students and emphasizes mathematical aspects of basic electromagnetic theory. The book presents basic electromagnetic theory starting from static fields to time-varying fields. Topics are divided into static electric fields, static magnetic fields, time-varying fields, and electromagnetic waves. The goal of this text is to help students understand the physical meaning of formulas that are used in electromagnetic theory. Many formulas commonly used for electromagnetic analysis are mathematically derived from a few empirical laws. Physical interpretations of formulas are de-emphasized. Each important formula is framed to indicate its significance. Primary Theory of Electromagnetics shows a clear and rigorous account of formulas in a consistent manner, thus letting students understand how electromagnetic formulas are related to each other.

The Problem Book in Quantum Field Theory contains about 200 problems with solutions or hints that help students to improve their understanding and develop skills necessary for pursuing the subject. It deals with the Klein-Gordon and Dirac equations, classical field theory, canonical quantization of scalar, Dirac and electromagnetic fields, the processes in the lowest order of perturbation theory, renormalization and regularization. The solutions are presented in a systematic and complete manner. The material covered and the level of exposition make the book appropriate for graduate and undergraduate students in physics, as well as for teachers and researchers.

Electromagnetic Field TheoryA Problem Solving ApproachElectromagnetic Field TheoryA Collection of ProblemsSpringer Science & Business Media

Guru and Hiziroglu have produced an accessible and user-friendly text on electromagnetics that will appeal to both students and professors teaching this course. This lively book includes many worked examples and problems in every chapter, as well as chapter summaries and background revision material where appropriate. The book introduces undergraduate students to the basic concepts of electrostatic and magnetostatic fields, before moving on to cover Maxwell's equations, propagation, transmission and radiation. Chapters on the Finite Element and Finite Difference method, and a detailed appendix on the Smith chart are additional enhancements. MathCad code for many examples in the book and a comprehensive solutions set are available at www.cambridge.org/9780521830164.

A Problem Solving Approach

The Classical Theory of Fields

Theory and Applications

Maxwell's Equations and the Principles of Electromagnetism

Electromagnetic Theory

Reviews the fundamental concepts behind the theory and computation of electromagnetic fields The book is divided in two parts. The first part covers both fundamental theories (such as vector analysis, Maxwell's equations, boundary condition, and transmission line theory) and advanced topics (such as wave transformation, addition theorems, and fields in layered media) in order to benefit students at all levels. The second part of the book covers the major computational methods for numerical analysis of electromagnetic fields for engineering applications. These methods include the theoretical approaches for numerical analysis of electromagnetic fields: the finite difference method (the finite difference time-domain method in particular), the finite element method, and the integral equation-based moment method. The second part also examines fast algorithms for solving integral equations and hybrid techniques that combine different numerical methods to seek more efficient solutions of complicated electromagnetic problems. Theory and Computation of Electromagnetic Fields, Second Edition, Provides the foundation necessary for graduate students to learn and understand more advanced topics Discusses electromagnetic analysis in rectangular, cylindrical and spherical coordinates Covers computational electromagnetics in both frequency and time domains Includes new and updated homework problems and examples Theory and Computation of Electromagnetic Fields, Second Edition is written for advanced undergraduate and graduate level electrical engineering students. This book can also be used as a reference for professional engineers interested in learning about analysis and computation skills.

Foundations of Geophysical Electromagnetic Theory and Methods, Second Edition, builds on the strength of the first edition to offer a systematic exposition of geophysical electromagnetic theory and methods. This new edition highlights progress made over the last decade, with a special focus on recent advances in marine and airborne electromagnetic methods. Also included are recent case histories on practical applications in tectonic studies, mineral exploration, environmental studies and off-shore hydrocarbon exploration. The book is ideal for geoscientists working in all areas of geophysics, including exploration geophysics and applied physics, as well as graduate students and researchers working in the field of electromagnetic theory and methods. Presents theoretical and methodological foundations of geophysical field theory Synthesizes fundamental theory and the most recent achievements of electromagnetic (EM) geophysical methods in the framework of a unified systematic exposition Offers a unique breadth and completeness in providing a general picture of the current state-of-the-art in EM geophysical technology Discusses practical aspects of EM exploration for mineral and energy resources

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.

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.

Applied Electromagnetics

Innovative Approaches and Pedagogical Strategies

Electromagnetics, Volume 1 (BETA)

Electromagnetic Theory for Electromagnetic Compatibility Engineers

The Theory of the Electromagnetic Field

*Electromagnetics for Electrical Machines offers a comprehensive yet accessible treatment of the linear theory of electromagnetics and its application to the design of electrical machines. Leveraging valuable classroom insight gained by the authors during their impressive and ongoing teaching careers, this text emphasizes concepts rather than numerical methods, providing presentation/project problems at the end of each chapter to enhance subject knowledge. Highlighting the essence of electromagnetic field (EMF) theory and its correlation with electrical machines, this book: Reviews Maxwell's equations and scalar and vector potentials Describes the special cases leading to the Laplace, Poisson's, eddy current, and wave equations Explores the utility of the uniqueness, generalized Poynting, Helmholtz, and approximation theorems Discusses the Schwarz–Christoffel transformation, as well as the determination of airgap permeance Addresses the skin effects in circular conductors and eddy currents in solid and laminated iron cores Contains examples relating to the slot leakage inductance of rotating electrical machines, transformer leakage inductance, and theory of hysteresis machines Presents analyses of EMFs in laminated-rotor induction machines, three-dimensional field analyses for three-phase solid rotor induction machines, and more Electromagnetics for Electrical Machines makes an ideal text for postgraduate-level students of electrical engineering, as well as of physics and electronics and communication engineering. It is also a useful reference for research scholars concerned with problems involving electromagnetics.*

*This comprehensive introduction to classical electromagnetic theory covers the major aspects of the subject, including scalar fields, vectors, laws of Ohm, Joule, Coulomb, Faraday, Maxwell's equation, and more. Although an extensive background is not necessary, a general knowledge of physics and calculus is a prerequisite. This text is filled with numerous diagrams and illustrations.*

*This book is an electromagnetics classic. Originally published in 1941, it has been used by many generations of students, teachers, and researchers ever since. Since it is classic electromagnetics, every chapter continues to be referenced to this day. This classic reissue contains the entire, original edition first published in 1941. Additionally, two new forewords by Dr. Paul E. Gray (former MIT President and colleague of Dr. Stratton) and another by Dr. Donald G. Dudley, Editor of the IEEE Press Series on EM Waves on the significance of the book's contribution to the field of Electromagnetics.*

*Engineering Field Theory focuses on the applications of field theory in gravitation, electrostatics, magnetism, electric current flow, conductive heat transfer, fluid flow, and seepage. The manuscript first ponders on electric flux, electrical materials, and flux function. Discussions focus on field intensity at the surface of a conductor, force on a charged surface, atomic properties, doublet and uniform field, flux tube and flux line, line charge and line sink, field of a surface charge, field intensity, flux density, permittivity, and Coulomb's law. The text then takes a look at gravitation and fluid flow, magnetic flux, and electric potential. Topics include capacitance with mixed dielectric, capacitance, potential function, electric intensity, magnetization, field intensity, current loop and magnetic dipole, magnetic field of an electric current, velocity, pressure, gravitational field intensity, and gravitational constant. The book ponders on experimental techniques, numerical methods, and electromagnetic induction, including Hall effect, magnetic energy, method of construction, computer techniques, and space diagram. The publication is a highly recommended source material for engineers and researchers wanting to study further engineering field theory.*

Electromagnetic Fields and Waves

The Commonwealth and International Library: Applied Electricity and Electronics Division

FUNDAMENTALS OF ELECTROMAGNETIC THEORY, Second Edition

Introduction to Electromagnetic Theory

***Electromagnetic theory has been a basic subject taught for more than a century to physics students but not to the electrical-engineering student. Before the Second World War the engineer was well grounded in circuit theory but was notoriously weak in field theory; by and large he might have heard of Maxwell's equations but he certainly did not use them. Since the Second World War, many fac. tors have greatly changed the engineer's outlook; particularly the astonishing advances in electronics, in communications (particularly microwaves) and more recently in solid-state devices. Consequently, a basic course in electromagnetics and applications has been included in most first-degree courses in electrical and electronic engineering since about 1950. The many earlier excellent texts available were unsuitable for engineering courses in electromagnetics for two reasons. First, they had been written from the point of view of the physicist, being more concerned with basic principles than with applications. Second, the introduction of SI (rationalised MKS) units meant that these earlier texts needed to be revised. Consequently the new texts in this subject have been in the main written by and for electrical engineers: as examples see the books by Skilling, Cullwick, Carter, Hayt, and Lorrain and Corson. These excellent texts have been found too advanced and too lengthy for the short time allocated to electromagnetism at Nottingham, that is about fifteen lecture hours in the first year and about twenty in the second year.***

***Electromagnetic Fields***

***The Second Edition of this book, while retaining the contents and style of the first edition, continues to fulfil the require-ments of the course curriculum in Electromagnetic Theory for the undergraduate students of electrical engineering, electronics and telecommunication engineering, and electro-nics and communication engineering. The text covers the modules of the syllabus corresponding to vectors and fields, Maxwell's equations in integral form and differential form, wave propagation in free space and material media, transmission line analysis and waveguide principles. It explains physical and mathematical aspects of the highly complicated electromagnetic theory in a very simple and lucid manner. This new edition includes : • Two separate chapters on Transmission Line and Waveguide • A thoroughly revised chapter on Plane Wave Propagation • Several new solved and unsolved numerical problems asked in various universities' examinations***

***After a brief introduction into the theory of electromagnetic fields and the definition of the field quantities the book teaches the analytical solution methods of Maxwell's equations by means of several characteristic examples. The focus is on static and stationary electric and magnetic fields, quasi stationary fields, and electromagnetic waves. For a deeper understanding, the many depicted field patterns are very helpful. The book offers a collection of problems and solutions which enable the reader to understand and to apply Maxwell's theory for a broad class of problems including classical static problems right up to waveguide eigenvalue problems.***

***Foundations of Geophysical Electromagnetic Theory and Methods***

**ELECTROMAGNETISM**

**Engineering Field Theory**

**Electromagnetic Field Theory Fundamentals**

**Classical Electrodynamics**

The second edition of Electromagnetism: Theory and Applications has been updated to cover some additional aspects of theory and nearly all modern applications. The semi-historical approach is unchanged, but further historical comments have been introduced at various places in the book to give a better insight into the development of the subject as well as to make the study more interesting and palatable to the students. What is New to This Edition Vector transformations in different coordinate systems have been included in the chapter on Vector Analysis. The treatment forms the basis of vector potentials for three-dimensional problems. Chapter 13 on Vector Potentials has been significantly expanded for a clear understanding of the properties of vector potentials, in order to also solve three-dimensional EM problems numerically. A section dealing with the derivation and interpretation of Hertz Vector has been included in Chapter 13. A practical problem on induction heating of flat metal plates has been added to the chapter on Magnetic Diffusion. The topics of wave guidance and radiation have been expanded with emphasis on practical aspects. Sections on analysis of cylindrical dielectric waveguide (e.g. of optical fibres) have been added to Chapters 18 and 22. New sections on basis and explanations of modal transmissions have been added. Characteristics and practical details of basic antenna structures and arrays have been treated in greater detail. Provides comprehensive treatment of FEM (Finite Element Method), covering both its variational basis and procedural details, to enable the readers to use this method without going into the heavy mathematics underlying the method. Describes FDM (Finite Difference Method) in more detail with its convergence requirement. Introduces modern numerical methods like FDTD (Finite Difference Time Domain) and method of moments (MOM). A new chapter on Modern Topics and Applications covers both high frequency and low frequency applications. Appendices contain in-depth analysis of self-inductance and non-conservative fields (Appendix 6), proof regarding the boundary conditions (Appendix 8), theory of bicylindrical coordinate system to provide the physical basis of the circuit approach to the cylindrical transmission line systems (Appendix 10), and properties of useful functions like Bessel and Legendre functions (Appendix 9). The book is designed to serve as a core text for students of electrical engineering. Besides, it will be useful to postgraduate physics students as well as research engineers and design and development engineers in industries.

Electromagnetics (CC BY-SA 4.0) is an open textbook intended to serve as a primary textbook for a one-semester first course in undergraduate engineering electromagnetics, and includes:electric and magnetic fields; electromagnetic properties of materials; electromagnetic waves; and devices that operate according to associated electromagnetic principles including resistors,capacitors, inductors, transformers, generators, and transmission lines. This book employs the "transmission lines first" approach, in which transmission lines are introduced using a lumped-element equivalent circuit model fora differential length of transmission line, leading to one-dimensional wave equations for voltage and current. This book is intended for electrical engineering students in the third year of a bachelor of science degree program. A free electronic version of this book is available at: https://doi.org/10.7294/W4W0Q12M

Teaching Electromagnetics: Innovative Approaches and Pedagogical Strategies is a guide for educators addressing course content and pedagogical methods primarily at the undergraduate level in electromagnetic theory and its applications. Topics include teaching methods, lab experiences and hands-on learning, and course structures that help teachers respond effectively to trends in learning styles and evolving engineering curricula. The book grapples with issues related to the recent worldwide shift to remote teaching. Each chapter begins with a high-level consideration of the topic, reviews previous work and publications, and gives the reader a broad picture of the topic before delving into details. Chapters include specific guidance for those who want to implement the methods and assessment results and evaluation of the effectiveness of the methods. Respecting the limited time available to the average teacher to try new methods, the chapters focus on why an instructor should adopt the methods proposed in it. Topics include virtual laboratories, computer-assisted learning, and MATLAB® tools. The authors also review flipped classrooms and online teaching methods that support remote teaching and learning. The end result should be an impact on the reader represented by improvements to his or her practical teaching methods and curricular approach to electromagnetics education. The book is intended for electrical engineering professors, students, lab instructors, and practicing engineers with an interest in teaching and learning. In summary, this book: Surveys methods and tools for teaching the foundations of wireless communications and electromagnetic theory Presents practical experience and best practices for topical coverage, course sequencing, and content Covers virtual laboratories, computer-assisted learning, and MATLAB tools Reviews flipped classroom and online teaching methods that support remote teaching and learning Helps instructors in RF systems, field theory, and wireless communications bring their teaching practice up to date Dr. Krishnasamy T. Selvan is Professor in the Department of Electronics & Communication Engineering, SSN College of Engineering, since June 2012. Dr. Karl F. Warnick is Professor in the Department of Electrical and Computer Engineering at BYU. The comprehensive study of electric, magnetic and combined fields is nothing but electromagnetic engineering. Along with electronics, electromagnetics plays an important role in other branches. The book is structured to cover the key aspects of the course Electromagnetic Field Theory for undergraduate students. The knowledge of vector analysis is the base of electromagnetic engineering. Hence book starts with the discussion of vector analysis. Then it introduces the basic concepts of electrostatics such as Coulomb's law, electric field intensity due to various charge distributions, electric flux, electric flux density, Gauss's law, divergence and divergence theorem. The book continues to explain the concept of elementary work done, conservative property, electric potential and potential difference and the energy in the electrostatic fields. The detailed discussion of current density, continuity equation, boundary conditions and various types of capacitors is also included in the book. The book provides the discussion of Poisson's and Laplace's equations and their use in variety of practical applications. The chapter on magnetostatics incorporates the explanation of Biot-Savart's law, Ampere's circuital law and its applications, concept of curl, Stoke's theorem, scalar and vector magnetic potentials. The book also includes the concept of force on a moving charge, force on differential current element and magnetic boundary conditions. The book covers all the details of Faraday's laws, time varying fields, Maxwell's equations and Poynting theorem. Finally, the book provides the detailed study of uniform plane waves including their propagation in free space, perfect dielectrics, lossy dielectrics and good conductors. The book uses plain, lucid language to explain each topic. The book provides the logical method of explaining the various complicated topics and stepwise methods to make the understanding easy. The variety of solved examples is the feature of this book which helps to inculcate the knowledge of the electromagnetics in the students. Each chapter is well supported with necessary illustrations and self-explanatory diagrams. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

Theory of Electromagnetic Wave Propagation

Electricity, Magnetism and Electromagnetic Theory

Field Theory Handbook

*This book is a first-year graduate text on electromagnetic fields and waves. It is the translated and revised edition of the Chinese version with the same title published by the Publishing House of Electronic Industry (PHEI) of China in 1994. The text is based on the graduate course lectures on "Advanced Elec trodynamics" given by the authors at Tsinghua University. More than 300 students from the Department of Electronic Engineering and the Depart*

ment of Applied Physics have taken this course during the last decade. Their particular fields are microwave and millimeterwave theory and technology, physical electronics, optoelectronics and engineering physics. As the title of the book shows, the texts and examples in the book concentrate mainly on electromagnetic theory related to microwaves and optoelectronics, or light wave technology. However, the book can also be used as an intermediate-level text or reference book on electromagnetic fields and waves for students and scientists engaged in research in neighboring fields.

This book addresses the theoretical foundations and the main physical consequences of electromagnetic interaction, generally considered to be one of the four fundamental interactions in nature, in a mathematically rigorous yet straightforward way. The major focus is on the unifying features shared by classical electrodynamics and all other fundamental relativistic classical field theories. The book presents a balanced blend of derivations of phenomenological predictions from first principles on the one hand, and concrete applications on the other. Further, it highlights the internal inconsistencies of classical electrodynamics, and addresses and resolves often-ignored critical issues, such as the dynamics of massless charged particles, the infinite energy of the electromagnetic field, and the limits of the Green's function method. Presenting a rich, multilayered, and critical exposition on the electromagnetic paradigm underlying the whole Universe, the book offers a valuable resource for researchers and graduate students in theoretical physics alike.