

# Basic Electrical Engineering By J S Katre

Schaum's Outline of Basic Electrical Engineering McGraw-Hill

This textbook provides comprehensive, in-depth coverage of the fundamental concepts of electrical engineering. It is written from an engineering perspective, with special emphasis on circuit functionality and applications. Reliance on higher-level mathematics and physics, or theoretical proofs has been intentionally limited in order to prioritize the practical aspects of electrical engineering. This text is therefore suitable for a number of introductory circuit courses for other majors such as mechanical, biomedical, aerospace, civil, architecture, petroleum, and industrial engineering. The authors' primary goal is to teach the aspiring engineering student all fundamental tools needed to understand, analyze and design a wide range of practical circuits and systems. Their secondary goal is to provide a comprehensive reference, for both major and non-major students as well as practicing engineers. This hallmark text on Basic Electrical Engineering provides concise and balanced account of all key concepts as well as applications in the field. With the liberal use of practical illustrations and numerous exercises, it offers an unparalleled exposure to

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Electricity Fundamentals, Network Theory, Electromagnetism, Electric Machines, Transformers, and Measuring Instruments.

With practically-oriented coverage of all the basic concepts in electrical engineering, this text is a general introduction to the field. It integrates conceptual discussions with current, relevant technological applications, presenting modularized coverage of a wide range of topics. In addition, it aims to offer strong pedagogical support and clear explanations.

The aim of this book is to provide a consolidated text for the first year B.E. Computer Science and Engineering students and B.Tech Information Technology students of Anna University. The syllabus has been thoroughly revised for the non-semester yearly pattern by the University. The book, made up of five chapters, systematically covers the five units of the syllabus. It begins with a detailed discussion on the fundamentals of electric circuits. DC circuits, AC circuits, 3-phase circuits, resonance and the network theorems. Lecture-type presentation of the rudiments of the fundamentals in conjunction with hundreds of solved examples is the strength of this book. Magnetic circuits and various magnetic elements and their properties, with number of illustrations are presented. DC machines and transformers are further dealt with. Equivalent circuits of machines supported with the respective

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photographs will ease the reader to understand the concepts of machines much better. Synchronous machines and asynchronous machines and fundamentals of control systems with various practical examples and relevant worked illustrations conclude this book. A large number of numerical illustrations and diagrammatic representations make this book valuable for students and teachers.

For the first time in India, we have a comprehensive introductory book on Basic Electrical Engineering that caters to undergraduate students of all branches of engineering and to all those who are appearing in competitive examinations such as AMIE, GATE and graduate IETE. The book provides a lucid yet exhaustive exposition of the fundamental concepts, techniques and devices in basic electrical engineering through a series of carefully crafted solved examples, multiple choice (objective type) questions and review questions. The book covers, in general, three major areas: electric circuit theory, electric machines, and measurement and instrumentation systems.

Electrical Engineering Essence of electricity, Conductors, Semiconductors and insulators (elementary treatment only); Electric field, electric current, Potential and potential difference, Electromotive force, Electric power, Ohm's law, Basic circuit components, Electromagnetism related laws, Magnetic field due to electric current flow, Force on a current carrying conductor placed in a magnetic field, Faradays laws of electromagnetic induction. Types of induced EMF's, Kirchhoff's laws, Simple problems. Network Analysis Basic definitions, Types of elements, types of sources, Resistive networks, Inductive networks, Capacitive networks, Series parallel circuits, Star delta and delta star transformation,

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Network theorems-Superposition, Thevenin's, Maximum power transfer theorems and simple problems. Magnetic Circuits Basic definitions, Analogy between electric and magnetic circuits, Magnetization characteristics of Ferro magnetic materials, Self inductance and mutual inductance, Energy in linear magnetic systems, Coils connected in series, Attracting force or electromagnets. Alternating Quantities Principle of ac voltages, Waveforms and basic definitions, Relationship between frequency, Speed and number of poles, Root mean square and average values of alternating currents and voltage, form factor and peak factor, Phasor representation of alternating quantities, The J operator and phasor algebra, analysis of ac circuits with single basic network element, single phase series circuits, Single phase parallel circuits, Single phase series parallel circuits, Power in ac circuits. Transformers Principles of operation, Constructional details, Ideal Transformer and Practical Transformer, Losses, Transformer Test, Efficiency and Regulation Calculations. Direct current machines Principle of operation of dc machines, Armature windings, E.M.F. equation in a dc machine, Torque production in a dc machine, Operation of a dc machine as a generator, Operation of a dc machine as a motor. A.C. Machines Three phase induction motor, principle of operation, Slip and rotor frequency, Torque (simple problems). Synchronous Machines Principle of operation, EMF equation (Simple problems on EMF). Synchronous motor principle and operation (Elementary treatment only) Basic Instrument Classification of instruments, Operating principles, Essential features of measuring instruments, Moving coil permanent magnet (PMMC) instruments, Moving Iron of Ammeters and Voltmeters (elementary treatment only).

This book is also available through the Introductory Engineering Custom Publishing System. If you are interested

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in creating a course-pack that includes chapters from this book, you can get further information by calling 212-850-6272 or sending email inquiries to [engineerjwiley.com](mailto:engineerjwiley.com). The authors offer a set of objectives at the beginning of each chapter plus a clear, concise description of abstract concepts. Focusing on preparing students to solve practical problems, it includes numerous colorful illustrative examples. Along with updated material on MOSFETS, the CRO for use in lab work, a thorough treatment of digital electronics and rapidly developing areas of electronics, it contains an expansive glossary of new terms and ideas.

The primary objective of vol. I of A Text Book of Electrical Technology is to provide a comprehensive treatment of topics in Basic Electrical Engineering both for electrical as well as nonelectrical students pursuing their studies in civil, mechanical, mining, textile, chemical, industrial, environmental, aerospace, electronic and computer engineering both at the Degree and diploma level. Based on the suggestions received from our esteemed readers, both from India and abroad, the scope of the book has been enlarged according to their requirements. Almost half the solved examples have been deleted and replaced by latest examination papers set upto 1994 in different engineering collage and technical institutions in India and abroad.

The book is written per the syllabus of first year engineering degree course for various universities. It covers basic topics of electrical engineering. It also includes worked out examples, University examination questions and answers, exercise, etc in every chapter. This book is suitable for course in basic electrical engineering under various Universities. Authors have tried to elucidate the topics in such a way that even a mediocre student can assimilate them. Many solved problems, sample question papers and exercise given in every section will provide a thorough understanding of the

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topics. Other features include attractive writing style, well structured equations and numerical examples, pictures of high clarity, etc.

The author explains the various environmental and health hazards due to electricity in its many forms, and sets out methods and practices to reduce risks (including operations in specialised environments such as explosive atmospheres and flammable dusts). The book should be valuable reference material not only to practising electrical engineering students, but also for personnel and safety managers with responsibility for safety in the workplace.

Although, a number of books, written by various authors on the subject are available in the market. However, the author feels that this book will facilitate the students not only to prepare for the regular University examinations. The book is also quite suitable for the professionals since many live examples have been incorporated. The book has the following exclusive features: (i) The Learning objectives of each chapter have been incorporated in the beginning to develop curiosity among the students. (ii) Practice exercise have been added in all the chapters after suitable intervals to impart necessary practice. (iii) At the end of each chapter, its summary highlights are given. This will enable the students to revise the subject matter quickly. (iv) A number of short answer and test questions have

been given at the end of each chapter. While answering these questions, the readers will have to think deep into the subject matter. This will improve their analytical approach. Consequently, the students/readers will be in position to respond in a better way while appearing before the selection board or to deal with practical problems. (v) A sufficient number of objective type questions (MCQ) have been given at the end of each chapter. These questions will help the students to perform better in the competitive examinations. (vi) The subject matter is treated in a simple and lucid manner so that an average student can understand the subject easily. Although, typical mathematical expressions are avoided but simple mathematical relations are used for better explanation and understanding.

A comprehensive guide to electrical engineering. This book covers the basic areas of study in the basic, core electrical engineering course. Solved examples and problems enhance the reader's comprehension of the material. It serves as a self-study review for professional engineering exams. Basic Electrical and Electronics Engineering is a renowned book that attempts to provide a thorough coverage on basics of electrical and electronics engineering in a single volume. This second edition of the book has been carefully revised to include important topics like domestic wiring, electrical installations, instrument transformers, battery, etc.

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Written in a lucid manner, it enables the learners to apply the basic concepts of electrical and electronics engineering for multi-disciplinary tasks and lays the foundation for higher level courses. Rich pool of problems and appendices enhance the utility of the book and make it a lasting resource for students and instructors of all branches of engineering.

Pragmatic Electrical Engineering: Fundamentals introduces the fundamentals of the energy-delivery part of electrical systems. It begins with a study of basic electrical circuits and then focuses on electrical power. Three-phase power systems, transformers, induction motors, and magnetics are the major topics. All of the material in the text is illustrated with completely-worked examples to guide the student to a better understanding of the topics. This short lecture book will be of use at any level of engineering, not just electrical. Its goal is to provide the practicing engineer with a practical, applied look at the energy side of electrical systems. The author's "pragmatic" and applied style gives a unique and helpful "non-idealistic, practical, opinionated" introduction to the topic. Table of Contents: Basic Stuff / Power of the Sine / Three-Phase Power Systems / Transformers / Machines / Electromagnetics

Stormy development of electronic computation techniques (computer systems and software), observed during the last decades, has made possible automation of data processing in many important human activity areas, such as science, technology, economics and labor organization. In a broadly understood technology

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area, this development led to separation of specialized forms of using computers for the design and manufacturing processes, that is: – computer-aided design (CAD) – computer-aided manufacture (CAM) In order to show the role of computer in the first of the two applications mentioned above, let us consider basic stages of the design process for a standard piece of electronic system, or equipment: – formulation of requirements concerning user properties (characteristics, parameters) of the designed equipment, – elaboration of the initial, possibly general electric structure, – determination of mathematical model of the system on the basis of the adopted electric structure, – determination of basic responses (frequency- or time-domain) of the system, on the base of previously established mathematical model, – repeated modification of the adopted diagram (changing its structure or element values) in case, when it does not satisfy the adopted requirements, – preparation of design and technological documentation, – manufacturing of model (prototype) series, according to the prepared documentation, – testing the prototype under the aspect of its electric properties, mechanical durability and sensitivity to environment conditions, – modification of prototype documentation, if necessary, and handing over the documentation to series production. The most important stages of the process under discussion are illustrated in Fig. 1. 1. xi xii

Introduction Fig. 1.

This book is the collection of the contributions offered at the International Symposium on Electromagnetic Fields in Electrical Engineering, ISEF '87, held in Pavia, Italy, in

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September 1987. The Symposium was attended by specialists engaged in both theoretical and applied research in low-frequency electromagnetism. The charming atmosphere of Pavia and its ancient university provided a very effective environment to discuss the latest results in the field and, at the same time, to enjoy the company of colleagues and friends coming from over 15 countries. The contributions have been grouped into 7 chapters devoted to fundamental problems, computer programs, transformers, rotating electrical machines, mechanical and thermal effects, various applications and synthesis, respectively. Such a classification is merely to help the reader because a few papers could be put in several chapters. Over the past two decades electromagnetic field computations have received a big impulse by the large availability of digital computers with better and better performances in speed and capacity. Many various methods have been developed but not all of them appear convenient enough for practical engineering use. In fact, the technical and industrial challenges set some principal attributes and criteria for good computation methods. They should be relatively easy to use, fit into moderately sized computers, yield useful design data, maintain flexibility with minimum cost in time and effort.

This Book Is Written For Use As A Textbook For The Engineering Students Of All Disciplines At The First Year Level Of The B.Tech. Programme. The Text Material Will Also Be Useful For Electrical Engineering Students At Their Second Year And Third Year Levels. It Contains Four Parts, Namely, Electrical Circuit Theory,

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Electromagnetism And Electrical Machines, Electrical Measuring Instruments, And Lastly The Introduction To Power Systems. This Book Also Contains A Good Number Of Solved And Unsolved Numerical Problems. At The End Of Each Chapter References Are Included For Those Interested In Pursuing A Detailed Study. This new edition of a proven textbook provides comprehensive, in-depth coverage of the fundamental concepts of electrical and computer engineering. It is written from an engineering perspective, with special emphasis on circuit functionality and applications. Reliance on higher-level mathematics and physics, or theoretical proofs has been intentionally limited in order to prioritize the practical aspects of electrical engineering. This text is therefore suitable for a number of introductory circuit courses for other majors such as robotics, mechanical, biomedical, aerospace, civil, architecture, petroleum, and industrial engineering. The authors' primary goal is to teach the aspiring engineering student all fundamental tools needed to understand, analyze and design a wide range of practical circuits and systems. Their secondary goal is to provide a comprehensive reference, for both major and non-major students as well as practicing engineers. This comprehensive book with a blend of theory and solved problems on Basic Electrical Engineering has been updated and upgraded in the Second Edition as per the current needs to cater undergraduate students of all branches of engineering and to all those who are appearing in competitive examinations such as AMIE, GATE and graduate IETE. The text provides a lucid yet

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