Principles of Engineering Physics 1

This is a textbook for an introductory course in engineering physics. It provides a coherent treatment of the basic principles and theories of engineering physics and offers a balance between theoretical concepts and their applications. Beginning with a comprehensive discussion on oscillations and waves with applications in the field of mechanical and electrical engineering, it goes on to explain basic concepts such as Huygen’s principle, Fresnel’s biprism, Fraunhofer diffraction and polarization.

All chapters are interspersed with rich pedagogical features such as solved problems, unsolved exercises and multiple choice questions with answers. It will help undergraduate students of engineering acquire skills for solving difficult problems in quantum mechanics, electromagnetism, nanoscience, energy systems and other engineering disciplines.

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Principles of Engineering Physics 1

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To all our beloved people who have sacrificed their lives for the betterment of the world through science, technology and social service.
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Science in general may be described as organized common sense. In the real world of science, nothing prevails except rationality and logics. Science does not believe in miracles. Clear understanding of the basic principles of science is essential for technological and social development. Once upon a time, the base of engineering was mainly empirical; however, now it is completely scientific. Physics is a fundamental aspect of science on which all engineering sciences have been built upon. Nowadays, more stress is given to the understanding of the basic principles rather than on remembering specific procedures. The fundamental concepts of physics have paved the way for the development of technologies. All modern technological advances from laser micro surgery to television, from computers to dishwashers to mobile phones, from remote controlled toys to space vehicles, trace back directly to the principles of physics. Accordingly, the syllabus of engineering courses includes physics as an essential ingredient.

This book, entitled *Principles of Engineering Physics 1*, is designed as a textbook keeping in view the engineering physics course curricula prescribed by most technical universities of India. The present book begins with oscillations and waves and ends with holography, containing altogether fourteen chapters. This book is written in a logical and coherent manner for easy understanding. The concepts of physics are mathematized without losing the beauty of the physical ideas involved. Emphasis has been given to an understanding of the basic concepts and their applications to a number of engineering problems. Each topic has been discussed in detail, both conceptually and mathematically, so that students do not face any kind of difficulties. All the derivations and solutions of numerical examples are given in detail. Each chapter contains a large number of solved numerical examples, unsolved numerical problems with answers, practical applications, theoretical questions, and multiple choice questions with answers. Certain topics and derivations that are not included directly in the syllabi have also been included in the book for the sake of continuity and completeness. The scope of the book thus has been expanded beyond the basic needs of undergraduate engineering students. We hope this book will be of immense help not only to the students but also to the teachers.

The authors sincerely request the readers for their constructive criticisms via emails *mdnkhan1964@yahoo.com* and *spanigrahi@nitrkl.ac.in* for future modification of the book.
Acknowledgment

It is a pleasure to express our deep appreciation to the engineering students (both continuing and passed out) of IGIT Sarang and NIT Rourkela who have borne with us in our class teachings. Many suggestions from our colleagues, students and reviewers have gone a long way in the development of this book. Our sincere thanks are due to them. We gratefully acknowledge the ideas received from a number of standard books on physics as given in the bibliography. We sincerely thank the editorial team at Cambridge University Press, India, for their keen interest in publishing this book in a nice format. We particularly wish to thank Gauravjeet Singh Reen for many helpful suggestions and improvements.