

Engineering Drawing

This valuable textbook offers detailed discussion of the fundamental concepts of engineering drawing in an easy to understand manner. Important topics including projections of solids, auxiliary projections, sections of solids, isometric projections, orthographic projections and projection of planes are discussed comprehensively. Multi-aspect pedagogical features—more than 400 solved examples, 275 practice problems and 250 short answer questions—will help students in learning fundamental concepts. The text is written to cater to the needs of undergraduate students of all branches of engineering for an introductory course in engineering drawing/engineering graphics/computer aided engineering drawing.

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Engineering Drawing

Principles and Applications

Lakhwinder Pal Singh

Harwinder Singh



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To Our Parents and Teachers

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Preface

This text book is an endeavour to deal with the subject of Engineering Graphics and Drawing in such a way that students can understand the subject thoroughly. The subject of Engineering Drawing and (Computer) Graphics is a core course taught to the first year students of all disciplines of engineering in all engineering colleges and universities. Therefore, this text book is an attempt to help students grasp the basic concepts of engineering drawing clearly and easily.

The book has many distinguishing features. It covers the fundamental concepts of manual and computer aided drafting. It includes more than 400 solved examples and 275 practice exercises along with 250 short answer questions, i.e., objective type questions with answers.

The organisation of this text is done very clearly and logically. Each chapter is organised as basic theory, solved problems, exercises and objective type questions. Each chapter contains a large number of worked examples, the problems for which have been selected from examinations of different universities. This book comprises 19 chapters, starting with an introduction to drawing instruments and their uses, followed by Chapter 2 on various types of lines and their uses and layout of a drawing sheet. Chapter 3 attempts to give knowledge about the various methods and principles of dimensioning of a drawing. The description about sections and conventions is given in Chapter 4, followed by Chapter 5 on geometrical constructions. From here onward, various scales are described in Chapter 6 and then the concept of orthographic projection is described in Chapter 7. Chapter 8 of the text is dedicated to projections of points, followed by projections of lines in Chapter 9. Once students are clear about the basic concepts of projections of points and lines, then this book introduces them to the projections of planes and auxiliary projections in Chapters 10 and 11, respectively.

Chapter 12 discusses the projections of solids followed by a lucid explanation of the sections of solids in Chapter 13: this will imbibe an imagination of the sections view of a solid object or engineering component. Students of first year in almost all branches of engineering are also offered a course on manufacturing processes and practices, where they need to do some jobs on sheet metal. Chapter 14 covers development of surfaces that will help students develop understanding of a pattern and calculate the requirement of sheet metal for mass production. Allied to this, students will get exposure to intersection of solids in Chapter 15.

It is very important to introduce students to isometric projections, so that they can imagine any shape from 2D surface to 3D; the same is explained in Chapter 16. Similarly conversion of pictorial view (3D) into orthographic view (2D) is described in Chapter 17. The same is followed by free hand sketches in Chapter 18 and basic principles and commands of computer graphics in Chapter 19.

Figures constitute the main feature of any engineering drawing book. Therefore, care has been taken that the figures are easily understood and students find it 'difficult to forget' them. Most of the problems are solved in the first-angle projection method; however, a few problems are also solved using the third-angle projection method. This book attempts to acquaint students with different types of questions. The contents of the book are in line with the syllabi of many universities, colleges and polytechnics in India.

A chapter on 'Computer Graphics' is given to explain the preparation of figures using 'AutoCAD'. The AutoCAD section of the book describes all the menu and commands items of the graphics package.

Overall, sincere efforts have been made to make this book student-friendly and self-explanatory. We are grateful to the Almighty for blessing us with good health and high spirits to take up this book as a project. We must concede that this book would never have been written without the constant support and encouragement of our family members, especially our children. We are extremely thankful to our respective heads of the institutions: Professor L. K. Awasthi, Director, NIT Jalandhar, and Professor Sehijpal Singh, Principal, GNDEC Ludhiana, for their continuous motivation and support to pursue such endeavours. We also owe an enormous debt to our colleagues and students for much valued assistance in the form of discussions and feedback. We express our gratitude to the editorial team at Cambridge University Press, especially to Ms Taranpreet Kaur (Commissioning Editor) for her excellent ground work and syllabus research that helped us in deciding the table of contents. We always turned to her for suggestions wherever we were stuck and she was always available to answer our queries. Last but not least we are thankful to all our students and teachers who have taught us and made us what we are today.

We devote our work to the Almighty, whose blessings are always with us.

Any suggestion or criticism for further improvement of the book will be gratefully acknowledge and highly appreciated.

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