

# Preface

This book focuses on first and second-year undergraduate students of Mechanical Engineering, Aerospace Engineering and Chemical Engineering who are pursuing a course in Engineering Thermodynamics. It will prove to be a great aid in preparation for various universities semesterial examination. Readers who want to refresh, deepen and systemize their knowledge on this course will find this book as an ultimate resort.

Students often find Engineering Thermodynamics a back-breaking course, because of the rigor that this course offers and importance that it enjoys in later semesters of Mechanical Engineering. The market is flooded with exhaustive and heavy volumes on Engineering Thermodynamics, but there is no individual textbook that provides holistic, simple yet concise and quality coverage on all the key topics. This further adds up to the challenge specially during ‘*the exam days*’.

This book has a perfect blend of focused content coverage and key pedagogical aids following *question-and-answer format, based on real questions that real students ask*. The pedagogical aids have been designed using **5Es Approach: Engage, Explore, Explain, Elaborate and Evaluate**. Hence, this book from MHE fills the void in the market.

We may consider this book to be an attempt to supplement excellent comprehensive engineering thermodynamics textbooks like Engineering Thermodynamics (PK Nag, Sixth Edition, 2018), Basic and Applied Thermodynamics (PK Nag, Second Edition, 2009)

## Highlights

- Focus on basics
- **Just enough theory** with emphasis on special topics such as first law of thermodynamics, second law of thermodynamics, entropy, etc., which are frequently asked in exams
- **Solutions to previous year questions** given from universities such as AKTU, GTU, RGPV, AU, JNTU, VTU, etc.
- **Summary** at the end of each chapter to quickly review the concepts
- Well-labelled **illustrations** and graphical explanation of difficult topics like Entropy and Steam Cycles
- **Examination-oriented** pedagogy:
  - ◆ **158** step-wise Solved Examples
  - ◆ **124** Practice Problems
  - ◆ **115** Multiple Choice Questions

## Organization of the Book

This book comprises of 15 chapters. **Chapter 1** starts with the description of basic concepts of the subject and its applications in the vast field of engineering. **Chapter 2** discusses the core aspects of thermodynamics, namely, work and heat. **Chapter 3** takes into account the fundamentals of first law of thermodynamics, its properties and applications. **Chapter 4** deals with the application aspects of the first law when applied to various flow processes. **Chapter 5** is devoted to the description of second law of thermodynamics and covers fundamental theorems and heat engines. **Chapter 6** covers another important property of thermodynamics—entropy—in detail. **Chapter 7** deals with the outcome of the second law of thermodynamics, i.e. exergy (available energy), its analysis and concepts of irreversibility. **Chapter 8** is based on the properties of pure substance, gases and mixtures. **Chapter 9** touches upon the different thermodynamic relations, equilibrium and stability. **Chapter 10** elaborates on the first type of power cycle, i.e. vapour power cycle while **Chapter 11** elucidates another type of power cycle, i.e. gas power cycle. **Chapter 12** describes in detail the refrigeration cycles and their components. **Chapter 13** encompasses the concept of psychrometrics where the properties of atmospheric air, psychrometric chart and its different process are discussed. **Chapter 14** deals with reactive systems and covers chemical reactions, heat and mass laws, and third law of thermodynamics. **Chapter 15** describes the gas compressors along with its varied applications.

## Web Supplements

The text is supported by additional content which can be accessed from the weblink [http://www.mhhe.com/exam\\_prep/et](http://www.mhhe.com/exam_prep/et).

- *Solutions Manual (for Instructors and Students)*

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## Publisher Note

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