



[Manuals.plus](#) /

> [Wiley](#) /

> RF and Microwave Engineering: Fundamentals of Wireless Communications Instruction Manual

**Wiley 1394283466**

# RF and Microwave Engineering: Fundamentals of Wireless Communications

Instruction Manual

## INTRODUCTION

---

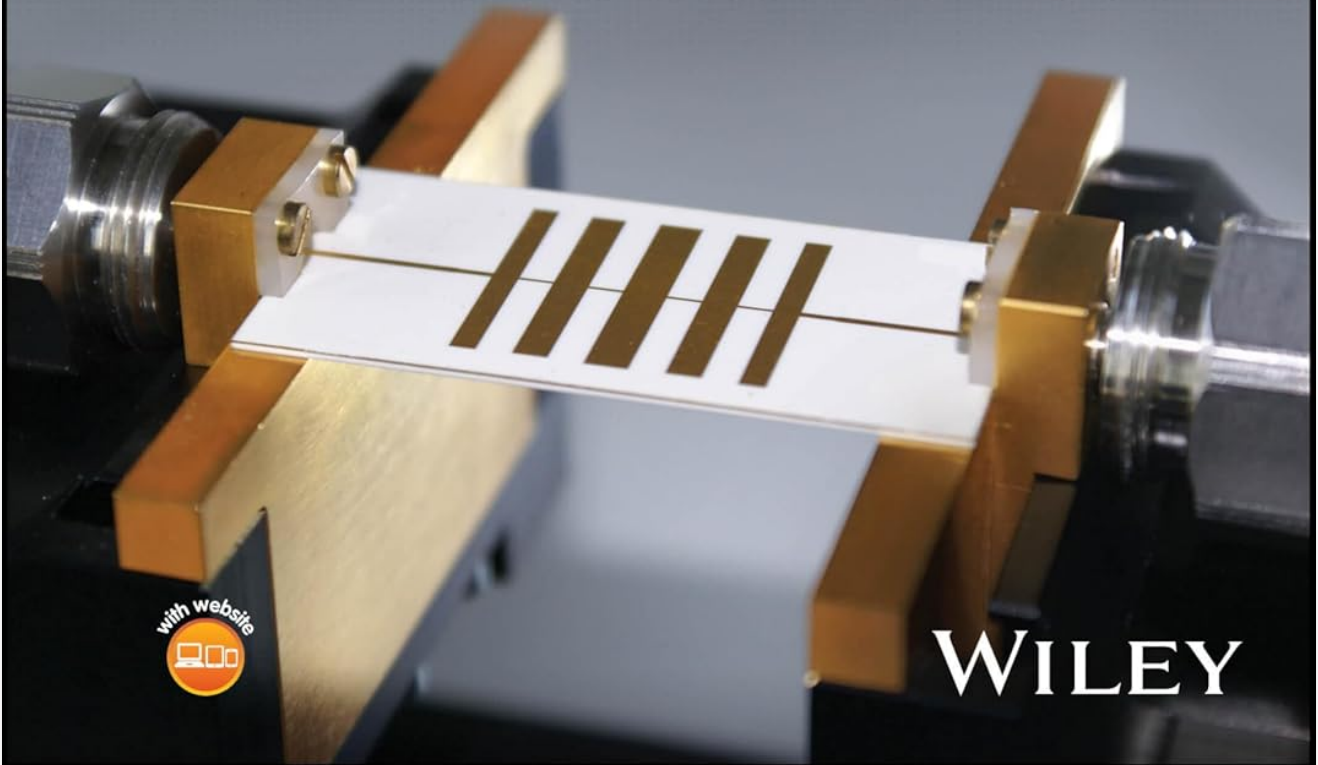
This manual provides an overview and guide to the textbook "RF and Microwave Engineering: Fundamentals of Wireless Communications" by Frank Gustrau. This comprehensive guide delves into the fundamentals of radio frequency (RF), microwave engineering, and the physical aspects of wireless communications. It combines physical-technical fundamentals with numerical simulations, presenting a wide range of RF topics with emphasis on physical aspects such as electromagnetic (EM) and voltage waves, transmission lines, passive circuits, and antennas. The text discusses the propagation of waves and their representation, effects, and utilization in passive circuits and antenna structures. It incorporates various design examples using circuit and EM simulation software and provides examples of modern RF tools to show how methods can be applied productively in RF engineering practice.

Frank Gustrau

Fourth  
Edition

# RF and Microwave Engineering

Fundamentals of Wireless  
Communications



The cover features the title 'RF and Microwave Engineering: Fundamentals of Wireless Communications' by Frank Gustrau, with 'Fourth Edition' indicated. An image of a microstrip line circuit is prominently displayed at the bottom.

**KEY CONCEPTS AND CHAPTERS**

---

The book covers a wide array of essential topics in RF and Microwave Engineering, including:

- **Transmission Line Theory and Transient Signals:** Covers characteristic line impedances, voltage waves, idealized lossless lines and cables with low losses, impedance transformation, reflection coefficient, and the Smith chart diagram.
- **Waveguides:** Explores coaxial lines (including weak losses), parallel wire lines, microstrip lines, rectangular waveguides, substrate-integrated-waveguides (SIW), and three-wire systems.
- **Scattering Parameters:** Discusses multiport equations in matrix form, special network properties of circuits, and the signal flow method.
- **High-Frequency Components and Circuits:** Details line filters, couplers, power dividers, and matching circuits.
- **Antenna Concepts and Radio Wave Propagation:** Addresses propagation in complex environments.

This revised edition also includes new chapters on:

- Monostatic and bistatic radar cross sections (RCS)
- Horn antennas
- 5G mobile communications
- Slot antennas
- Characteristics of resonators

## SETUP

---

As a textbook, the primary setup involves acquiring the physical or digital copy of the book. For optimal learning, ensure you have access to a quiet study environment and necessary tools such as pens, paper, and a calculator. The book is designed for use in electrical engineering courses, so familiarity with basic circuit theory and electromagnetic fields is beneficial.

A companion website is available which hosts solutions to the practice problems provided at the end of each chapter. Access to this website is recommended for self-assessment and deeper understanding.

## OPERATING (STUDYING)

---

To effectively utilize this textbook:

1. **Read Systematically:** Progress through chapters in the order presented, as concepts often build upon previous ones.
2. **Understand Core Principles:** Pay close attention to the physical aspects and fundamental theories discussed before moving to applications.
3. **Engage with Examples:** The book incorporates various design examples using circuit and EM simulation software. Work through these examples to solidify your understanding.
4. **Solve Practice Problems:** A list of practice problems is provided at the end of each chapter. Attempting these problems is crucial for reinforcing learned material and developing problem-solving skills. Utilize the companion website for solutions to verify your work.
5. **Utilize Modern RF Tools:** The text gives examples of modern RF tools. Familiarize yourself with how these methods can be applied productively in RF engineering practice.

## MAINTENANCE

---

To ensure the longevity and usability of your textbook:

- Store the book in a dry place away from direct sunlight to prevent page yellowing and binding deterioration.
- Handle with clean hands to avoid smudges and stains.
- Avoid bending the covers or spine excessively to preserve the binding integrity.
- Use bookmarks instead of folding pages to mark your place.

## TROUBLESHOOTING

---

If you encounter difficulties while studying:

- **Concept Difficulty:** Re-read the relevant sections, paying close attention to definitions and derivations. Refer to the provided examples.
- **Problem Solving Issues:** If you are stuck on a practice problem, review the chapter's content and similar examples. Consult the solutions on the companion website as a last resort, ensuring you understand the steps rather than just copying them.
- **Further Clarification:** For academic use, consult your instructor or peers for discussion and clarification on challenging topics.

## SPECIFICATIONS

---

<b>Publisher</b>	Wiley
<b>Publication Date</b>	March 10, 2025
<b>Edition</b>	4th
<b>Language</b>	English
<b>Print Length</b>	352 pages
<b>ISBN-10</b>	1394283466
<b>ISBN-13</b>	978-1394283460
<b>Item Weight</b>	1.8 pounds
<b>Dimensions</b>	7.2 x 1.02 x 10.24 inches

## ABOUT THE AUTHOR

---

Frank Gustrau has been a Professor at the University of Applied Sciences and Arts in Dortmund, Germany since 2003. Throughout his career in industry and academia, Professor Gustrau has supervised students in their project work, given lectures on different RF related topics, and worked extensively with EM and RF circuit simulation tools.