



# Electronic Communications System: Fundamentals Through Advanced, Fifth Edition

*By Wayne Tomasi*

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## **Electronic Communications System: Fundamentals Through Advanced, Fifth Edition** By Wayne Tomasi

For courses in Introduction to Electronic Communications and Digital and Data Communications. Comprehensive in scope and contemporary in coverage, this text introduces basic electronic and data communications fundamentals, and explores their application in modern digital and data communications systems. Students with previous knowledge in basic electronic principles and fundamental calculus concepts will gain a complete understanding of the topics presented here. Tomasi's Advanced Electronic Communications Systems 6/e is the last 10 chapters of this text.

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### Editorial Review

From the Back Cover

Now in its fifth edition, this text continues to provide a modern comprehensive coverage of electronic communications systems. It begins by introducing basic systems- and concepts and moves on to today's technologies: digital, optical fiber, microwave, satellite, and data and cellular telephone communications systems.

#### **Significant material has been added, including:**

- Three chapters on telephone circuits and systems
- Two chapters on cellular and PGS telephone systems
- Three chapters on fundamental concepts of data communications and networking
- New and updated figures

This text is designed for undergraduate communications courses in which students have prior knowledge of some basic electronic principles as well as an understanding of mathematics through the fundamental concepts of calculus.

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The purpose of this book is to introduce the reader to the basic concepts of traditional analog electronic communications systems and to expand the reader's knowledge of more modern digital, optical fiber, microwave, satellite, data, and cellular telephone communications systems. The book was written so that a reader with previous knowledge in basic electronic principles and an understanding of mathematics through the fundamental concepts of calculus will have little trouble understanding the topics presented. Within the text, there are numerous examples that emphasize the most important concepts. Questions and problems are included at the end of each chapter and answers to selected problems are provided at the end of the book.

This edition of *Electronic Communications Systems: Fundamentals Through Advanced* provides a modern, comprehensive coverage of the field of electronic communications. Although nothing has been omitted from the previous edition, there are several significant additions, such as three new chapters on telephone circuits and systems, two new chapters on cellular and PCS telephone systems, and three new chapters on the fundamental concepts of data communications and networking. In addition, numerous new figures have been added and many figures have been redrawn. The major topics included in this edition are as follows.

Chapter 1 introduces the reader to the basic concepts of electronic communications systems and includes a new section on power measurements using dB and dBm. This chapter defines modulation and demodulation and describes the electromagnetic frequency spectrum. Chapter 1 also defines bandwidth and information capacity and how they relate to one another, and provides a comprehensive description of noise sources and noise analysis.

Chapters 2 and 3 discuss signals, signal analysis, and signal generation using discrete and linear-integrated circuits. Chapter 3 gives a comprehensive coverage of phase-locked loops.

Chapters 4 through 8 describe analog communications systems, such as amplitude modulation (AM), frequency modulation (FM), phase modulation (PM), and single sideband (SSB). A comprehensive mathematical and theoretical description is given for each modulation technique and the basic components found in analog transmitters and receivers are described in detail.

Chapter 9 discusses the fundamental concepts of digital modulation, including comprehensive descriptions of amplitude-shift keying (ASK), frequency-shift keying (FSK), phase-shift keying (PSK), quadrature amplitude modulation (QAM), and differential phase-shift keying (DPSK). Chapter 9 introduces the student to trellis code modulation and gives a comprehensive description of probability of error, bit error rate, and error performance.

Chapters 10 and 11 describe the basic concepts of digital transmission and multiplexing. Chapter 10 describes pulse code modulation, while Chapter 11 describes time-division multiplexing of PCM-encoded signals and explains the North American Digital Hierarchy and the North American FDM Hierarchy. Wavelength division multiplexing of light waves is also introduced in Chapter 11.

Chapters 12 through 15 describe the fundamental concepts of electromagnetic waves, electromagnetic wave propagation, metallic and optical fiber transmission lines, free-space wave propagation, and antennas.

Chapters 16 through 18 give a comprehensive description of telephone instruments, signals, and wireline systems used in the public telephone network. Chapters 19 and 20 describe the basic concepts of wireless telephone systems, including cellular and PCS.

Chapters 21 through 23 introduce the fundamental concepts of data communications circuits and describe basic networking fundamentals, such as topologies, error control, protocols, hardware, accessing techniques, and network architectures.

Chapters 24 through 26 describe the fundamental concepts of terrestrial and satellite microwave-radio communications. Chapter 24 describes analog terrestrial microwave systems; Chapters 25 and 26 describe digital satellite systems.

Appendix A describes the Smith Chart.

## **Users Review**

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