Wireless Comes of Age
- Guglielmo Marconi invented the wireless telegraph in 1896
  - Communication by encoding alphanumeric characters in analog signal
  - Sent telegraphic signals across the Atlantic Ocean
- Communications satellites launched in 1960s
- Advances in wireless technology
  - Radio, television, mobile telephone, communication satellites
- More recently
  - Satellite communications, wireless networking, cellular technology

Broadband Wireless Technology
- Higher data rates obtainable with broadband wireless technology
  - Graphics, video, audio
- Shares same advantages of all wireless services: convenience and reduced cost
  - Service can be deployed faster than fixed service
  - No cost of cable plant
  - Service is mobile, deployed almost anywhere

Limitations and Difficulties of Wireless Technologies
- Wireless is convenient and less expensive
- Limitations and political and technical difficulties inhibit wireless technologies
- Lack of an industry-wide standard
- Device limitations
  - E.g., small LCD on a mobile telephone can only displaying a few lines of text
  - E.g., browsers of most mobile wireless devices use wireless markup language (WML) instead of HTML

Part One: Background
- Provides preview and context for rest of book
- Covers basic topics
  - Data Communications
  - TCP/IP

Chapter 2: Transmission Fundamentals
- Basic overview of transmission topics
- Data communications concepts
  - Includes techniques of analog and digital data transmission
- Channel capacity
- Transmission media
- Multiplexing
Chapter 3: Communication Networks
- Comparison of basic communication network technologies
  - Circuit switching
  - Packet switching
  - Frame relay
  - ATM

Chapter 4: Protocols and the TCP/IP Protocol Suite
- Protocol architecture
- Overview of TCP/IP
- Open systems interconnection (OSI) reference model
- Internetworking

Part Two: Wireless Communication Technology
- Underlying technology of wireless transmission
- Encoding of analog and digital data for wireless transmission

Chapter 5: Antennas and Propagation
- Principles of radio and microwave
  - Antenna performance
  - Wireless transmission modes
  - Fading

Chapter 6: Signal Encoding Techniques
- Wireless transmission
  - Analog and digital data
  - Analog and digital signals

Chapter 7: Spread Spectrum
- Frequency hopping
- Direct sequence spread spectrum
- Code division multiple access (CDMA)
### Chapter 8: Coding and Error Control
- Forward error correction (FEC)
- Using redundancy for error detection
- Automatic repeat request (ARQ) techniques

### Part Three: Wireless Networking
- Examines major types of networks
  - Satellite-based networks
  - Cellular networks
  - Cordless systems
  - Fixed wireless access schemes
- Use of mobile IP and Wireless Access Protocol (WAP) to provide Internet and Web access

### Chapter 9: Satellite Communications
- Geostationary satellites (GEOS)
- Low-earth orbiting satellites (LEOS)
- Medium-earth orbiting satellites (MEOS)
- Capacity allocation

### Chapter 10: Cellular Wireless Networks
- Cellular wireless network design issues
- First generation analog (traditional mobile telephony service)
- Second generation digital cellular networks
  - Time-division multiple access (TDMA)
  - Code-division multiple access (CDMA)
- Third generation networks

### Chapter 11: Cordless Systems and Wireless Local Loop
- Cordless systems
- Wireless local loop (WLL)
  - Sometimes called radio in the loop (RITL) or fixed wireless access (FWA)

### Chapter 12: Mobile IP and Wireless Access Protocol
- Modifications to IP protocol to accommodate wireless access to Internet
- Wireless Application Protocol (WAP)
  - Provides mobile users access to telephony and information services including Internet and Web
  - Includes wireless phones, pagers and personal digital assistants (PDAs)
Part Four: Wireless Local Area Networks
- Examines underlying wireless LAN technology
- Examines standardized approaches to local wireless networking

Chapter 13: Wireless LAN Technology
- Overview of LANs and wireless LAN technology and applications
- Transmission techniques of wireless LANs
  - Spread spectrum
  - Narrowband microwave
  - Infrared

Chapter 14: IEEE 802.11 Wireless LAN Standard
- Wireless LAN standards defined by IEEE 802.11 committee

Chapter 15: Bluetooth
- Bluetooth is an open specification for wireless communication and networking
  - Personal computers
  - Mobile phones
  - Other wireless devices

Internet and Web Resources
- Web page for this book
  - WilliamStallings.com/Wireless1e.html
- Useful web sites, errata sheet, figures, tables, slides, internet mailing list, wireless courses
- Computer Science Student Support Site
  - WilliamStallings.com/StudentSupport.html
- Newsgroups
  - comp.std.wireless
  - comp.dcom.*