

TEXT BOOK:
Wireless Communications and Networks
by
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REFERENCE BOOK:
Modern Wireless Communications
By
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Introduction

Chapter 1



Wireless Comes of Age

- Guglielmo Marconi invented the wireless telegraph in 1896
 - Communication by encoding alphanumeric characters in analog signal
 - In 1901, sent telegraphic signals across the Atlantic Ocean (1800 miles)
- Communications satellites launched in 1960s
- Advances in wireless technology have led to
 - Radio, television, mobile telephone, communication satellites



The Cellular Revolution

- The first-generation mobile (cellular) phone used analog technology (1980 ~ 1990)- AMPS
- The second-generation mobile phone used digital technology (1990 ~ 2002)- GSM
- The third-generation mobile phone used new communication technology to support high bandwidth (up to 2 Mbps)- IMT 2000



Broadband Wireless Technology

- Higher data rates obtainable with broadband wireless technology
 - WLAN: 2 Mbps ~ 100 Mbps
 - HomeRF: 1 Mbps ~ 10 Mbps
 - 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
 - <http://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.*

Wireless Communications & Networks (2nd Edition) [Stallings, William] on Amazon.com. *FREE* shipping on qualifying offers. Wireless Communications & Networks (2nd Edition). Designed for students and professionals, this text explores the key networking topics with a unique approach covering: technology and architecture, network design approaches, and types of networks and applications. Distinguishing key features. Provides an entire chapter on spread spectrum, which is pervasive in wireless technology today. Also provides an entire chapter on satellite communications. This topic remains an important area within wireless communications. Thorough coverage of cordless systems. Text Book "Wireless Communications and Networks" By W. Stallings Prentice Hall, 2nd Edition 2005. Course Assessment Assignment 10% Quiz 15% Mid-term Test 25% Final Examination 50% Total 100%. Wireless Communication: History and Background. Wireless communication What is wireless communication: Any form of communication that does not require the transmitter (Tx) and receiver (Rx) to be in physical contact Electromagnetic wave propagated through free- space Early wireless communication: Visible light: 390 to 750 nm wave length or 400- 790 Tera Hertz Band ! Wireless Communications And Networking book. Read reviews from world's largest community for readers. For one-semester, undergraduate/graduate-level cour... This comprehensive, well-organized text covers wireless communication and networks, and the rapidly growing associated technologies the most exciting areas in the overall communications field. It explores the key topics in the following general categories: technology and architecture, network type, design approaches, and applications. An emphasis on specific wireless standards reflects the importance of such standards in defining the available products and future research directions in this field.