

Wireless Communication Systems

Barcelona (Spain)

31 March - 11 April 2025

UK Training

PARTNER



Wireless Communication Systems

Code: GC28 From: 31 March - 11 April 2025 City: Barcelona (Spain) Fees: 8600 Pound

Introduction

This 10-day training course on Wireless Communication Systems is designed to provide participants with a comprehensive understanding of the principles, technologies, and applications of wireless communication. This course covers the basics of wireless communication, advanced techniques, and emerging trends in the field, equipping participants with the knowledge and skills needed to excel in this dynamic sector of wireless communication technology.

Course Objectives

- Understand the basics of wireless communication: Establish a strong foundation in the fundamental principles and components of wireless communication systems.
- Explore various types of wireless communication: Learn about different types of wireless communication systems such as cellular networks, Wi-Fi, Bluetooth, and satellite communication.
- Analyze the performance of wireless communication systems: Study key performance metrics and techniques for evaluating and optimizing communication system wireless.
- Examine advanced topics in wireless communication: Dive into modulation schemes, error correction, and multiple access techniques.
- Discuss the latest trends and developments: Stay updated on innovations and future directions in professional wireless communications.

Course Outlines

Day 1: Fundamentals of Wireless Communication

- Overview of wireless communication systems.
- Radio wave propagation and its significance.
- Antennas and their characteristics in wireless communication.
- Signal transmission and reception principles.
- Introduction to wireless communication protocols and standards.

Day 2: Cellular Networks

- Evolution of cellular networks from 1G to 5G.
- Structure and architecture of cellular networks.
- Frequency reuse and handoff strategies.
- Multiple access techniques FDMA, TDMA, CDMA, OFDMA.
- LTE and 5G technologies in wireless communication.

Day 3: Wireless Local Area Networks WLAN



- Introduction to WLAN and its importance in wireless communication.
- IEEE 802.11 standards Wi-Fi and their role.
- WLAN architecture and components.
- Security protocols in WLAN.
- Techniques for performance optimization in WLANs.

Day 4: Bluetooth and Personal Area Networks PAN

- Overview of Bluetooth technology and its applications.
- The Bluetooth protocol stack.
- Security, pairing, and communication in Bluetooth.
- Overview of other PAN technologies Zigbee, UWB.

Day 5: Satellite Communication Systems

- Basics of satellite communication and its advantages.
- Different types of satellites GEO, MEO, LEO.
- Satellite communication links and their design.
- Applications of satellite communication in modern systems.

Day 6: Modulation and Coding Techniques

- Introduction to modulation techniques in wireless communication.
- Digital modulation schemes ASK, FSK, PSK, QAM.
- Error detection and correction methods.
- Channel coding techniques for reliable transmission.
- Trade-offs between modulation and coding.

Day 7: Multiple Antenna Techniques

- Introduction to MIMO Multiple Input Multiple Output systems.
- Diversity and spatial multiplexing for improved performance.
- Beamforming techniques and their benefits.
- System capacity and how MIMO enhances wireless communication systems.
- Applications of MIMO technology in advanced wireless communication.

Day 8: Mobile Ad Hoc Networks MANETs

- Fundamentals and features of MANETs.
- Routing protocols tailored for MANETs.
- Security challenges faced by MANETs.
- Performance metrics and evaluations for MANETs.
- Practical applications of MANETs in professional wireless solutions.

Day 9: Emerging Wireless Technologies

- The Internet of Things IoT and its implications for wireless communication.
- 5G technologies and beyond.
- Cognitive radio networks and their applications.



- Millimeter-wave communication and its potential.
- Wireless sensor networks and their significance.

Day 10: Future Trends and Research Directions

- Advanced topics in wireless communication technology.
- Current trends and innovations in wireless communication solutions.
- Challenges and opportunities in the field of professional wireless communications.
- Future research directions and emerging areas of interest.
- Final review and interactive Q&A session.

Conclusion

By the end of this course, participants will have gained both the essential and advanced knowledge needed to understand and apply the principles of wireless communication systems effectively. The focus on advanced wireless communication techniques and practical insights ensures that participants are well-equipped to make informed decisions in their professional careers, harnessing wireless communication technology for optimal results.



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