BLACKBIRD FOR TRAINING

# Essential Wireless Communication Systems

25 – 29 October 2027
Düsseldorf (Germany)



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## Introduction

In an era where wireless communication technology is reshaping the way we connect and communicate, mastering the principles of wireless communication systems is crucial for professionals in the field. This 1-week intensive training course is designed to equip participants with both the basics of wireless communication and advanced techniques used in modern communication networks.

Covering a wide spectrum of types of wireless communication — from cellular networks and WLAN to satellite communications and Bluetooth — this course provides a comprehensive understanding of the architecture, protocols, and technologies that power seamless connectivity. Additionally, participants will explore emerging innovations such as 5G, IoT Internet of Things, and millimeter-wave communication, preparing them to thrive in this fast-evolving sector.

## Course Objectives

By the end of this wireless communication training course, participants will:

- Understand the Fundamentals: Learn the basics of wireless communication, including key concepts, standards, and signal propagation.
- Explore Various Wireless Systems: Gain in-depth knowledge of different types of wireless communication, such as cellular networks, WLAN, Bluetooth, and satellite communication.
- Analyze and Optimize Systems: Evaluate performance metrics and apply optimization strategies for robust wireless communication solutions.
- Master Advanced Techniques: Dive into modulation, coding, and MIMO Multiple Input Multiple Output systems to enhance system performance.
- Stay Updated on Emerging Trends: Discover the latest advancements in 5G, IoT, and millimeter-wave communication, and understand their impact on global connectivity.
- Develop Practical Skills: Acquire hands-on experience in implementing and troubleshooting wireless communication systems using real-world scenarios.



# Course Outlines

## Day 1: Fundamentals of Wireless Communication

- Introduction to wireless communication systems and their importance.
- Understanding radio wave propagation and its role in communication.
- Key characteristics of antennas and their impact on signal transmission and reception.
- Principles of wireless communication protocols and standards.
- Overview of different types of wireless communication and their applications.

## Day 2: Cellular Networks

- Evolution of cellular networks from 1G to 5G.
- Architectural design and structure of cellular communication systems.
- Concepts of frequency reuse and handoff strategies for seamless connectivity.
- Introduction to multiple access techniques: FDMA, TDMA, CDMA, and OFDMA.
- A detailed look at LTE and 5G technologies as part of advanced wireless communication.

## Day 3: Wireless Local Area Networks WLAN & Bluetooth

- Fundamentals of WLAN Wireless Local Area Networks and IEEE 802.11 standards Wi-Fi.
- WLAN architecture, components, and security protocols.
- Optimization techniques for enhancing wireless communication solutions in WLAN.
- Introduction to Bluetooth technology and its practical applications in wireless communication.
- Understanding the Bluetooth protocol stack and its security features.

## Day 4: Satellite Communication Systems & Advanced Techniques

- Basics of satellite communication systems and their advantages.
- Different types of satellites: GEO Geostationary Earth Orbit, MEO Medium Earth Orbit, and LEO Low Earth Orbit.
- Satellite communication links and system design for optimized communication.
- Introduction to modulation techniques: ASK Amplitude Shift Keying, FSK Frequency Shift Keying, PSK Phase Shift Keying, and QAM Quadrature Amplitude Modulation.
- Overview of MIMO systems and their role in advanced wireless communication.

## Day 5: Emerging Wireless Technologies & Future Trends

- The role of IoT in wireless communication, enabling smart devices and real-time data exchange.
- Advances in 5G technologies and the path towards 6G.
- Cognitive radio networks and their application in spectrum optimization.
- Exploring the potential of millimeter-wave communication for ultra-fast data transfer.
- Future research directions and innovations in wireless communication technology.



## Why Attend this Course? Wins & Losses!

- Master Wireless Communication Technology: Gain expertise in both foundational principles and advanced wireless communication concepts.
- Career Advancement: Enhance your professional profile with cutting-edge knowledge of 5G, IoT, and satellite communication.
- Hands-on Expertise: Participate in practical exercises and real-world case studies to develop skills in implementing and troubleshooting wireless communication systems.
- Stay Ahead of the Curve: Equip yourself with insights into future trends, including 6G and cognitive radio networks.
- Comprehensive Learning Experience: Understand how different types of wireless communication work together to shape global connectivity.

## Conclusion

This 1-week wireless communication training course offers participants an exceptional opportunity to gain deep expertise in wireless communication systems, covering both basic principles and advanced technologies.

Whether you are looking to enhance your career, strengthen your technical skills, or stay updated on the latest trends in the field, this course provides the knowledge and expertise needed to excel. Take the next step towards mastering wireless communication technology and be a leader in the evolution of global connectivity.

**Enroll today and secure your place in the rapidly advancing world of wireless communication!**

