RF and Radio Network Fundamentals

This course provides a technical introduction to RF fundamentals. You'll learn RF concepts such as frequency spectrum, bandwidth considerations, the propagation of radio signals from transmitter to receiver, key RF measurements, and types of interferences. You'll learn the fundamentals of wireless networks and the evolution of networks to centralized and virtualized RANs. Lastly, you'll expand your skills and knowledge in antenna theory basics, the network impact from various antenna types, and key antenna techniques such as beamforming and MIMO for improving network performance and capacity.

Intended Audience

This course is designed for a broad audience of personnel working in the wireless industry.

Objectives

After completing this course, the student will be able to:

- Describe how radio signal propagates to carry information
- Define key RF terminologies and measurement
- Identify different radio frequency spectrum used in cellular networks
- identify key components of the cell sites
- List antenna types and key parameters and techniques related to antenna

What You Can Expect

- Self-Paced Duration: 1.5 HOUR

Outline

1. **RF Fundamentals**
   - 1.1 Radio Signals and Frequency spectrum
   - 1.2 Propagation over the air
   - 1.3 Digital modulation for data transfer
   - 1.4 Spectrum for cellular networks
   - 1.5 Low, Mid, High frequency bands
   - 1.6 Relationship of frequency bands and bandwidth
   - 1.7 Coverage and Capacity
   - 1.8 RF terminology
   - 1.9 RF measurements
2. **Wireless Network Fundamentals**
   - 2.1 Cellular technology evolution - from 1G to 5G
   - 2.2 End-to-end Wireless Network
   - 2.3 Radio network evolution
   - 2.4 Cell site components
   - 2.5 Radio Units and Baseband Units
   - 2.6 C-RAN and V-RAN
3. **Antenna and Radio Propagation**
   - 3.1 Cellular antenna evolution
   - 3.2 Antenna parameters
   - 3.3 Transmit and Receive chains
   - 3.4 Advanced antenna techniques
   - 3.5 MIMO techniques
   - 3.6 Beamforming