# RF fundamentals Training

BILGINC IT Academy
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bilginc.com

Duration: **2 Day**

Radio Frequency engineering is an important yet often overlooked area in today's wireless world. This course provides a grounding in RF theory and practice for wireless, cellular and microwave systems.

## Prerequisites

None.

## What You Will Learn

By the end of the course delegates will be able to:

- Explain the basics of RF.
- Describe RF propagation and antenna principles.
- Calculate propagation losses and link budgets.
- Test RF systems.

## Training Outline

**What is RF?**

Definition of RF, RF wave characteristics: Frequency, wavelength, power, phase, impedance, RF history, radio signals, frequency bands, safety issues, legal issues.

**RF systems**

Microwaves, cellular/mobile RF, WLANs, other fixed wireless networks, basic RF components.

Building a basic WLAN network.

**RF system components**

Transmitters: Antennas: Isotropic, Dipole, how antennas achieve gain.

**Modulation**

Schemes, bandwidth, AM, FM, FSK, PSK, QAM, QPSK, interference, performance.

Interference and performance.

**Multiple access schemes**

FDMA, CDMA, TDMA, CSMA/CA.

**Wireless systems**

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Cellular (GSM, UMTS), Wifi, WiMax, others: GPS, DBS, RFID, radar, Bluetooth.

cellular.

**Spread Spectrum technologies**

Spread spectrum benefits and disadvantages, how it works, Direct Sequence, Frequency Hopping, hybrids.

**RF propagation**

Models, link budget, Smith chart, RF matching with the Smith chart. cell capacity, tradeoffs: power vs. bandwidth, free space, reflection, diffraction, multipath cancellation, propagation prediction and measurement tools.

Smith charts.

**RF testing**

Why power rather than voltage/current, units of power, dB and dBm power conversions. Test equipment: signal generators, power meters, network analysers, spectrum analysers. RF test setups: return loss, insertion loss.

RF testing.