Systems & Network Training

RF fundamentals

A 2 day Hands on training course

Save on expenses. This course is also available on your premises.

Description

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.

Key outcomes

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 approach

This structured course uses Instructor Led Training to provide the best possible learning experience. Small class sizes ensure students benefit from our engaging and interactive style of teaching with delegates encouraged to ask questions throughout the course. Quizzes follow each major section allowing checking of learning. Hands on sessions are used throughout to allow delegates to consolidate their new skills.

Details

Who will benefit?
Those working with wireless, cellular and microwave systems.

Prerequisites
None.

Duration: 2 days

Customer rating: ★★★★★

Generic training	Small class sizes	Hands On training	Our courseware	Customise your course
Generic training compliments product specific courses covering the complete picture of all relevant devices including the protocols "on the wire".	We limit our maximum class size to 8 delegates; often we have less than this. This ensures optimal interactivity between delegates and instructor.	The majority of our courses use hands on sessions to reinforce the theory.	We write our own courses; courseware does not just consist of slides and our slides are diagrams not bullet point text.	Please contact us if you would like a course to be customised to meet your specific requirements. Have the course your way.
"*Friendly environment with expert teaching that teaches the why before the how.*" G.C. Fasthosts	*"Excellent course. The small class size was a great benefit..."* M.B. IBM	*"Not many courses have practice added to it. Normally just the theoretical stuff is covered."* J.W. Vodafone	*"Comprehensive materials that made the course easy to follow and will be used as a reference point."* V.B. Rockwell Collins	*"I was very impressed by the combination of practical and theory. Very informative. Friendly approachable environment, lots of hands on."* S.R. Qinetiq

RF fundamentals

Course content

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. Hands on: 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. Hands on: Interference and performance.

Multiple access schemes

FDMA, CDMA, TDMA, CSMA/CA.

Wireless systems

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