Radio Frequency (RF) Engineering

Course Overview

This module examines the evolution of the cellular network with emphasis on second and third generation mobile communications. An analysis of the electromagnetic spectrum and other key RF fundamentals form the basis for a comprehensive examination of key concepts such as; multiple access techniques, modulation, transmitters and receivers, and network architecture.

Duration

5 Days

Delivery Method

Classroom based, instructor led tuition with elements of guided research to develop academic writing skills.

Audience

The course is aimed at people who are looking to establish themselves in the mobile telecommunications industry as network surveyors, architects, field engineers and planners.

Course Prerequisites

Students attending this course should have a good understanding of the electromagnetic spectrum.

Course Objectives

On completion of the course delegates will be able to:

- Understanding the planning and methodology of academic writing with emphasis on structure and formatting.
- Understand the characteristics of an RF wave.
- Explain modulation and different modulation techniques.
- Understand GSM 2G, GPRS and EDGE technology, network topology and functionality.
- Explain the role of the SIM, mobile station and security measures in the mobile environment.
- Specify the correct antenna and suitable frequencies for specific roles or environments.
- Differentiate between different multiple access methods such as TDMA, FDMA and CDMA.
- Understand the security and authentication mechanisms of GSM.
- Explain the architecture of a UMTS network.
- Understand UMTS scrambling codes.
- Explain the UMTS authentication process, highlighting key differences in comparison to GSM authentication.

Radio Frequency (RF) Engineering (continued)

Content Headings

- Academic writing and research methodology
- An introduction to the electromagnetic spectrum
- The characteristics of a wave
- An introduction to modulation
- The mobile station and SIM
- The base station subsystem
- The network switching subsystem
- Multiple access techniques
- GSM frequencies
- GSM air Interface
- GSM security
- Introduction to UMTS
- UMTS topology and elements
- UMTS air interface
- Cell breathing
- UMTS security

Assignment/Assessment

The student will submit a 4000-6000 word assignment on a subject covered in the course syllabus within six months.

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