

**Introduction:**

Daniels Electronics Ltd. offers a one-day radio basics training course for technicians new to the radio communications field or wishing to brush up on RF theory.

A second day may be added to the course (by the instructor or the customer), allowing for more hands-on experience by the students, however the students should be able to supply additional equipment for the hands-on portion as described in the Course Requirements.

The course may be offered at the Daniels factory in Victoria, BC, Canada or in other select locations throughout North America. The courses are typically scheduled 2-3 months in advance. The Daniels training department maintains an e-mail contact list to notify students of upcoming courses when they are scheduled.

The Daniels training department can also schedule a training course at your facility for a minimum charge based on 8 students. Please contact the Daniels Sales department for a quote.

Contact Information:**Pete Lunness, ASCT**

Training and Special Projects

Direct Line: 1-250-414-6279

1-800-664-4066 ext. 279

training@danelec.com

Pete is a member of the Applied Science Technologists & Technicians of B.C., has a diploma in Electronics Engineering Technology from Camosun College and a Certificate in Adult and Continuing Education from the University of Victoria. Pete has been instructing Daniels technical training courses for eleven years.

Student Prerequisites:

It is not necessary, but the students should be familiar with general electronics and computing technologies.

Course Handouts:

Course Enrollment includes a Radio System Basics and RF Fundamentals Training Guide, Land Mobile Radio Systems Training Guide, Technical Notes, training tool kit and some other items. The Guide and Technical Notes will be referenced and used throughout the class.

The Guides are available at www.danelec.com/support/training/training_dl.asp.

The Technical Notes are available at www.danelec.com/library/english/technotes.asp.

Course Length:

Although the course length may vary, the course typically runs from 8:00 AM until 4:30 PM, with a 45 minute lunch and several 15 minute breaks throughout the day.



Course Requirements:

When holding the course at the customers' facility, the customer is required to provide a training room free from distractions and comfortable for the students.

The instructor will supply a projector, a Daniels radio system with a variety of control cards, an IFR 3920 Test Set, and all additional equipment required to demonstrate radio system tuning, testing and maintenance procedures.

For a more hands-on training course, the customer can also set up a work area for every 3 or 4 students that includes:

- * Daniels (or another) radio system
- * Test Set (any test set the student does or will be using)
- * Set of extender cards (for the Daniels radio system)
- * RF cables and adapters (N to BNC, SMB to BNC)
- * Alligator clips used to connect to an audio line (or a custom audio connector)
- * Power supply and cables
- * Any other meters (DVM, SINAD, etc. not available on Test Set)
- * Any other test equipment typically used by students to maintain a site

The students may also bring any of this equipment to any Daniels training course.

Course Objectives / Learning Outcomes:

At the end of the training course the students will be able to:

- * demonstrate the ability to maintain and tune radio equipment in accordance with the TIA, given the proper test equipment and documentation.
- * describe RF theory, including modulation, propagation, bandwidth and signal processing and how to apply that theory in practice.
- * list all of the various organizations and terminology that are part of the RF environment.

Course Outline:

This course outline is flexible and will change according to the students needs.

Students in this course are strongly encouraged to be participatory during class. Prepare for the class in advance by bringing questions, thoughts and ideas.

Morning

Introductions, Housekeeping and Expectations.

Part One: The students will be introduced to the basics theoretical concepts of RF.

Students will follow along with the Daniels Radio System Basics and RF Fundamentals Training Guide:

Chapter 1: What is RF? (The RF Spectrum, Organizations, Terminology, RF Channels and Bandwidth, Simplex and Duplex, Radio Propagation)

Chapter 2: Audio and Modulation (Analog and Digital Signal Processing, CTCSS, DTMF, Modulation of the RF Carrier, Radio Access Technologies)

Afternoon

Part Two: The students will be introduced to the practical concepts of RF, including equipment and test procedures.

Students will continue to follow along with the Daniels Radio System Basics and RF Fundamentals Training Guide:

Chapter 3: Basic RF Components (Transmitters and Receivers, Oscillators, Duplexers, Multicouplers, Combiners, Tone Remote, E&M, Antennas)

Chapter 4: Radio System Testing (Introduction to TIA-603-C and TIA-102, TIA Definitions, Measurement Methods, Performance Standards, Test Information)

The instructor will include demonstrations of testing and tuning a radio system according to TIA documentation, using a Daniels repeater / base station and an IFR 3920 Test Set. Students can follow along if they are prepared for hands-on.