



NYSBA ON-LINE ENGINEERING TRAINING



RF 101: Terrestrial Transmission Systems Course – Eight Modules presented by Dennis Baldrige, CPBE, 8-VSB, AMD, DRB, CBNT

Instructing and the creator of the RF101: Terrestrial Transmission Systems course is Dennis Baldrige, CPBE, 8-VSB, AMD, DRB, CBNT, a veteran of the broadcast engineering field for more than 30 years. Baldrige is a senior member of the SBE, holds an FCC Lifetime General License (formerly a First Class FCC License) and Amateur Radio Extra Class License (K0DB). He also holds a M.A.E. and teaches science courses for Upper Iowa University. As owner of Baldrige Communications, LLC, he works as a contract engineer and authored articles for Radio Guide. Baldrige serves as an inspector for the FCC Alternate Inspection Program of the Wisconsin Broadcasters Association.



Each of the eight modules are described below:

RF101: Terrestrial Transmission Systems Course **Module 1 - Introduction to Radio Frequency (RF)**

Length: 1 hour, 16 minutes

Join us for the first module of the new SBE RF101: Terrestrial Transmission Systems course, **Introduction to Radio Frequency (RF)**. The webinar includes: Definition of RF and Electromagnetic radiation and spectrum, Electric and magnetic fields, The Inverse Square Law and Attenuation of EM waves, Frequency bands and RF wave characteristics, Units of power: dB and dBm, History of RF, and Safety issues introduction: Exposure and limits.

RF101: Module 2, Transmission Lines

Length: 1 hour, 15 minutes

This is the second in an eight-part series that presents an overview of RF needed to understand and work with the RF end of the system. The webinar continues the RF101 training and discusses these topics: the definition and types of transmission lines; impedance and its importance to applications; losses associated with coax; wavelength considerations which impact the broadcast facility; return losses (including VSWR and standing waves), and power considerations of both coax and connectors.

RF101: Module 3, Towers, Antennas, and Transmission Systems

Length: 1 hour, 30 minutes

This module continues the RF101 Series and covers these topics: transmission systems block diagram; common RF system components; antennas and terms; isotropic radiator; dipole and polarization; wavelength versus antenna size; variations on the dipole; and antenna gain introduction. This course is targeted to those with minimal or no background in RF and/or are relatively new to the field.

RF101: Module 4, Antenna Gain - Feed-Line Loss

Length: 1 hour, 36 minutes

The information learned in Modules 2 and 3 focus into this important discussion highlighting the relationship between gain and loss. Calculations and examples are discussed in these topics: coverage requirements; ERP versus TPO; review of directivity and gain; system losses; single radiator, multiple radiators, and other gain/loss calculations. This webinar continues the eight-part series that is targeted to those with minimal or no background in RF and/or are relatively new to the field. This multi-module course will present an overview of RF needed to understand the basics and make informed decisions.

RF101: Module 5, Modulation Fundamentals

Length: 1 hour, 11 minutes

This webinar will cover the basics of the various modulation methods used in broadcasting. The discussion will begin with an overview of the communications model and progress to the following: modulation definition, classes of amplifiers and efficiency; analog modulation principles of AM & FM; digital modulation principles; IBOC Radio; Digital TV; bit error rate function; forward error correction; constellation and eye diagrams; and signal and noise.

RF101: Module 6, AM, FM, TV RF Propagation

Length: 1 hour, 15 minutes

This introductory propagation webinar builds upon the previous modules with further discussion of the various ways RF is propagated in the atmosphere. The discussion will include the following: free space path loss; terrestrial propagation; predicted coverage and the aspects that can affect reception (such as terrain and interference); and a more in-depth look into AM, FM & TV signals.

RF101: Module 7, RF Test and Measurement

Length: 1 hour, 16 minutes

This introductory RF Test and Measurement webinar will explore the common transmission measurements that engineers will be called upon to perform. This will include - but is not limited to - frequency, power, occupied bandwidth and modulation. Technical considerations specific to each test will be considered along with applicable FCC rules. A brief look into antenna and feed-line measurements will furnish a better understanding of what to expect from a good operation transmission system. Tests specific to AM, FM and TV broadcast will be examined.

RF101: Module 8, FCC Regulations

Length: 1 hour, 15 minutes

This introduction to FCC regulations will explore the rules commonly applicable to broadcast facilities, which all engineers will be called upon to understand and apply. Sample topics include: Regulations: Friend or Foe?, Navigating the Maze, About the FCC, Checklists, Rules Common to All Services, AM specific, FM specific and DTV specific.

RF Safety presented by Richard Strickland

Noted RF Safety expert Richard Strickland instructs the course. Strickland founded [RF Safety Solutions](#) in 2001 after ten years as Director of Business Development for Narda Safety Test Solutions, the world's leading supplier of RF safety measurement and monitoring products. As director of the RF safety business at Narda, Strickland determined which products were developed and their performance characteristics. He frequently functioned as program manager, as he did with the Nardalert XT RF personal monitor. He initiated the development of RF radiation training courses at Narda and has conducted courses ranging from basic employee awareness seminars to in-depth application specific courses. Strickland holds an MBA from the University of Massachusetts and a B.A. in Physics from



Bridgewater College. He has had more than 50 articles published on RF safety, high-power amplifiers and radomes and has conducted more than 500 public and in-house training courses on RF safety and measurement.

RF Safety Course

Length: 3 hour, 10 minutes

This course provides an updated overview of RF radiation issues and practices for broadcasters, including: proving compliance at a broadcast site; biological effects of RF radiation and the distinct differences between RF radiation and ionizing radiation; FCC and OSHA regulations - what they are and what you need to do to comply; workplace hazards; transmitter sites; SNG and ENG trucks; remote operations (where news personnel can find problems such as on rooftops); the unique issues at AM stations, RF hazard protection equipment - you may not need it but your contractors probably will; and signs - what they mean and what you need.

It is designed for broadcast station personnel, including chief and assistant chief engineers, transmitter site engineers, ENG and SNG maintenance personnel and management who need to have an understanding of RF safety issues and regulations. It is recommended that persons taking the SBE RF Safety Course have at least a basic knowledge of electronics and understand the concept of frequency. Noted RF Safety expert Richard Strickland serves as the instructor for this course.