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ARRL Teachers Institute on Wireless Technology 2017

Bringing hands-on STEM applications to the classroom with Amateur Radio.

Teachers who are looking for ways to integrate topics in science and math with technology and engineering (STEM) need look no further than ARRL's Teachers Institute on Wireless Technology.

The ARRL Teachers Institute on Wireless Technology offers expenses-paid professional development seminars that equip teachers with tools and strategies for introducing basic electronics, radio science, satellite communications, microcontroller programming, and basic robotics into their classrooms. Amateur Radio is a featured tool in that strategy.

During the summer of 2017, ARRL's Education & Technology Program will offer two sessions of the introductory Teachers Institute (TI-1) workshop and one advanced (TI-2) workshop.

TI-1: Introduction to Wireless Technology

The TI-1 curriculum covers fundamental principles of electronics, Ohm's Law, electronic components, and simple circuits. Participants get a "Soldering 101" tutorial and get soldering practice by building a 24-hour digital clock. They also explore concepts such as oscillators, amplifiers, filters, mixers, and rectifiers, and they get experience with an oscilloscope. The course introduces digital signals and processing, microcontrollers, and programming. Participants build and test a variety of circuits to demonstrate programming concepts. While at the Institute, teachers also learn about Amateur Radio, taking part in a transmitter hunt, and a demonstration of Amateur Radio satellite communication. Depending on the class location, they can check out the host station and might even get on the air.

Another key area of instruction has participants assembling and programming simple robots built around the Basic Stamp microcontroller. An Amateur Radio license is not required to apply for the TI-1 workshop.

TI-2: Remote Sensing and Data Gathering

The topic for the TI-2 session in 2017 will be *Remote Sensing and Data Gathering*. This seminar will address analog-to-digital conversion and data sampling. Satellite telemetry data will be gathered from Amateur Radio satellites and applied to math and science topics. TI-2 participants will also construct a marine research buoy outfitted with sensors, and they will learn how sensor measurements are converted to information about the environment. They'll learn how to program a microcontroller to sample the data, configure it for Automatic Packet Reporting System (APRS) transmission, and receive and upload data to *Excel* for evaluation and analysis. Prior completion of the TI-1 workshop is a pre-requisite for TI-2.

TI-2 participants also learn to use the Boe-Bot® robot provided in the introductory workshop for MAREA — Mars lander Amateur Radio Robotic Exploration Activity — operation. (Read more about MAREA at **www.arrl.org/marea**.)

More Information

The Teachers Institute gets high marks from participants. Fifth grade teacher Chris Laster, KM4KPJ, of Georgia, said the TI-1 session gave him "tons of ideas to implement and a much deeper understanding of radio science and electronics that will make me both a better ham and a better teacher."

Visit **www/arrl.org/ti** for an application and more information, including a video offering an inside look at the institute.

Contributions from individuals and from corporate and institutional supporters make the annual ARRL Teachers Institutes possible. Donate today at **www.arrl.org/education-and-technology-fund**.

2017 Teachers Institute Schedule

Application Deadline for All Sessions is May 1, 2017

Date	Location
TI-1 Introduction to Wireless Technology	
July 17 – 21, 2017	Dayton Amateur Radio Association, Dayton, OH
July 24 – 28, 2017	ARRL Headquarters, Newington, CT
TI-2 Remote Sensing and Data Gathering	
July 10 – 13, 2017	ARRL Headquarters, Newington, CT