ETA International is proud to provide training through outside vendors in popular technology areas related to ETA certification at Education Forum 2019, co-locating with the International Wireless Communications Expo (IWCE). ETA will provide opportunities to test in each area during IWCE, and will also offer a series of Short Courses.

\* *Training courses must be purchased separately and are not part of any IWCE conference package.*

Session # DAS

**DAS and BDA Design, Installation and Maintenance (DAS)**

Monday, March 4 - Tuesday, March 5 \* 9:00am-5:00pm

Instructor: Ira Wiesenfeld, Merle Taylor, Joe Delio, IWATSI

*This is a multi-day course that takes place on Monday and Tuesday.*

This Hands-on Training Hosted by ETA Focuses on the Application and Optimization of Active and Passive Bi-Directional Amplifiers used in Today's Distributed Antenna Systems. This two-day course is for anyone interested in learning the fundamental theories, components, installation, maintenance, and support of in-building DAS. Each attendee will participate in a hands-on training lab concentrating on connector installation, a simple install, a simple antenna design, and how to identify cabling problems. Exposure to RF enery and related safety subjects will also be addressed. DISCUSSIONS INCLUDE:

• Antenna Types • Mounting Techniques • Propagation • Gain and Losses • Decibels • Pattern Distortions • Return Loss • Distance-to-Fault • Range • Impedance Matching • Bandwidth • Efficiency • Power Levels • Types of BDAs - Active/Passive • Polarization • Component Selection • Transmission Line Selection • Fiber Optic Connectivity • Antenna Diversity • Splitters, Couplers and Tags • Lightening Protection • Isolation • FCC Licensing Requirements

HANDS-ON EXERCISES INCLUDE:

• Testing Fundamentals • Calibration • Spectrum Analyzers • Connectorization • Reflectometers • RF Wattmeters • Determining Problems • System Sweeps • Distance-to-Fault Measurements • Fiber Optic Test Equipment • Troubleshooting

Course Cost: $899 (through 11/8); $949 (11/9 – 3/8)

Certification: ETA International Distributed Antenna Systems (DAS)

Certification Test: included in the price of the workshop

Session # MRT

**Microwave Fundamentals**

**Brought to you by Dover Telecommunication Services**

Monday, March 4 - Tuesday, March 5 \* 9:00am-5:00pm

Instructor: Tom Dover, President, Dover Telecommunications Services

*This is a multi-day course that takes place on Monday and Tuesday.*

Microwave radio is continuing to play an ever-increasing role in wireless communications. As we move towards 5G and FirstNet implementation, microwave frequencies will be used for more applications and new services. This course is newly designed addressing the changes in roles, performance, installation and maintenance of microwave and millimeter wave radios. Students taking this course, along with the ETA certification will learn the importance of microwave and millimeter wave radio systems as we move further into LTE and FirstNet. The theory of microwave propagation, modulation schemes and advances in passing high speed backhaul data using point to point links. Additionally, the use of multiple-in/multiple-out (MIMO) antennas to aggregate data streams will be covered; along with installation and maintenance of conventional microwave parabolic antennas.

Data Speed and capacity are key ingredients to building modern LTE and associated Wireless networks; microwave radio along with fiber optic cables play important roles. Turn-up and maintenance practices, including field proven techniques will be discussed and audience participation is highly encouraged. The use of test equipment, and radio interference at microwave frequencies will round out the course.

The instructor for this course is Tom Dover, President of DTS. Tom has more than 50 years of experience installing, maintaining and teaching microwave radio systems. An ETA certification test is included for those taking this course.

Course Cost: $899 (through 11/8); $949 (11/9 – 3/8)

Certification: Microwave Radio Technician (MRT)

Certification Cost: included in the price of the workshop

Session # GCT1

**General Communications Technician Training, Level 1**

Monday, March 4 - Tuesday, March 5 \* 9:00am-5:00pm

Instructors: Rob Walker, Owner, Walker & Associates

*This is a multi-day course that takes place on Monday and Tuesday.*

The General Communications Technician-Level 1 certification program introduces the attendee to basic elements of various communications concepts and technologies. This includes basic electronics, fundamentals of radio, tools, test equipment, power systems, cabling and installations, environmental systems, antennas, transmission lines, operating principles and details on radios and radio systems, serial data and IP networks, basics of fiber optic lines and systems, telephony, satellite communications, physical plant considerations, site procedures and safety practices. LMR communications, satellite, telephone, data, and computer technologies used in incident response and planned events.

General Communications Technician-Level 1 trains technicians on the practices and procedures common to radio communication technicians. This course will help communications technicians work within the Incident Command System (ICS) organizational structure. It is intended beginning technician or anyone that needs a technical understanding of communications systems. This course is ideal for federal, state, local, and tribal emergency response professionals and coordination/support personnel with communications backgrounds. Individuals who are responsible for managing a Strategic Technology Reserve (radio cache, mobile communications vehicle, or other deployable communications assets) are encouraged to attend. GCT1 is modeled after communication systems basics and expands on the US Department of Homeland Security's Communications Technician program. These areas include: basic electronics, fundamentals of radio, tools, test equipment, power systems, cabling and installations, environmental systems, antennas, transmission lines, towers, operating principles and details on radios and radio systems, serial data and IP networks, basics of fiber optic lines and systems, telephony, satellite communications, physical plant considerations, site procedures and safety practices.

Course Cost: $899 (through 11/8); $949 (11/9 – 3/8)

Certification: ETA International General Communications Technician-Level 1

Certification Test: included in the price of the workshop

Session # LAS

**Line and Antenna Sweep**

**Brought to you by Dover Telecommunication Services**

Monday, March 4 – Tuesday, March 5 \* 9:00 am – 5:00 pm

Instructor: Jay Thompson, CETsr, Trainer, Dover Telecommunications Services

*This is a multi-day course that takes place on Monday and Tuesday.*

Line and Antenna Sweep (LAS) testing has been with us for more than 50 years but it was primarily lab based. Handheld units now bring line sweeping into the field at a technician level. Carrier and equipment manufacturers develop installation Methods of Procedures to ensure every decibel of signal strength is maximized in the increasingly crowded RF spectrum. Line and antenna sweeping are critical tests for the installation, maintenance and troubleshooting of antenna components and networks. The course is about moving beyond a simple wattmeter test when installing or maintaining any antenna system. A review of decibels, Return Loss and VSWR along with the standard tests used for LAS will be covered. Many examples will be presented and hands on exercises will be conducted to ensure students are prepared to better understand antenna systems.

Course Cost: $899 (through 11/8); $949 (11/9 – 3/8)

Certification: ETA Line and Antenna Sweep

Certification Test: included in the price of the workshop

Session # STS

**Smart Buildings Technologies**

Monday, March 4 & Tuesday, March 5 \* 9:00 am – 5:00 pm

Wednesday, March 6 \* 8:00 am – 5:30 pm

Instructor: J.B. Groves, Wharton County Junior College

*This is a multi-day course that takes place on Monday, Tuesday and Wednesday.*

This class provides an overview to the Electronic Technicians Associations Smart Technology Systems Integrator Certification in order for the participant to develop the knowledge required for entry-level positions within the field of Smart Building Systems and related fields. The following key areas will be discussed: Audio and Video; Data Networks and Voice Networks; Fire Alarm Systems, Access Control Systems and Video Surveillance Systems; Heating, Ventilating and Air Conditioning Systems and Electric Power Management Systems, Lighting Control/Data Systems; andFacility Management Systems.

Hands on labs will include configuration of Power over Ethernet (PoE) powered devices and systems management software configuration of the devices.

Course Cost: $1099 (through 11/8); $1199 (11/9 – 3/8)

Certification: ETA Smart Technology Systems (STS) Integrator

Certification Test: included in the price of the workshop

Session # R56

**Communications Site Installer (R56) Training**

Monday, March 4 & Tuesday, March 5 \* 9:00 am – 5:00 pm

Wednesday, March 6 & Thursday, March 7 \* 8:00 am – 5:30 pm

Instructor: Michael Barton, CETsr, Senior Engineer, Motorola R56 Audit Team, Commdex Consulting

*This is a multi-day course that takes place on Monday, Tuesday, Wednesday and Thursday.*

STUDENTS MUST BRING A LAPTOP OR TABLET TO THE CLASS.

The Motorola Site Installation Practices (R56) Workshop course is designed to present the standards and guidelines for installing a Motorola communication system. Participants will understand how a properly installed system can help to ensure a safe and efficient communications system that will reduce system down time. After completing this course, the student will be able to:

1. List the purposes of grounding, and evaluate their importance in terms of personal safety, and effective system installation and protection;
2. Apply principles of basic electronics to the installation standards found in the R56 manual;
3. Determine how an effectively installed ground system protects a communication system from lightning strikes and electrical anomalies;
4. List the minimum requirements and specifications for: external and internal ground system installation equipment, cables, and documentation for a reliable communication system installation.

Course Cost: $1,299 (through 11/8); $1,399 (11/9 – 3/8)

Certification: Communications Site Installer (R56)

Certification Test: Included in the price of the workshop

Session # 5G

**5G Technician: An Introduction to 5G**

Wednesday, March 6 \* 8:30am-5:30pm

Instructor: Patrick McNerney, Chief Operating Officer, 3D Design & Engineering, Inc.

The 5G for Technicians certification is aimed at cellular technicians and engineers with basic knowledge of the wireless industry. The course serves as an introduction to 5G and gives cellular technicians the opportunity to earn a certification that has valuable industry application. This course will be taught using a variety of media, from helpful videos and other visual aids to written material. Attendees will get a first-hand look at industry standards, real world examples and case studies provided by a committee of subject matter experts with backgrounds in engineering, construction, cell carriers, broadcasting and entertainment. The examination covers a variety of topics including: 5G linguistics, uses of 5G (enterprise, consumers and government systems), 5G equipment specifications, 5G networks, 5G construction best practices, 5G infrastructure design and general design thinking principles and concepts.

Course Cost: $495 (through 11/8); $549 (11/9 – 3/8)

Certification: ETA International Radio Frequency Interference Mitigation (RFIM)

Certification Test:  included in the price of the workshop

Session # CET

**Associate Certified Electronics Technician**
Wednesday, March 6 - Thursday, March 7 \* 8:30am-5:30pm

Christopher Miller GROL, Professor of Technology, Heartland Community College

 *This is a multi-day course that takes place on Wednesday and Thursday.*

The Associate certification is designed for technicians who have less than two years of experience or trade school training for electronics technicians. Topics covered include:  DC Electronics, AC Electronics, Components & Semiconductors, Analog Circuits, Re-cabling & Telecommunications, Digital Circuits & Microprocessors, Troubleshooting, Test Equipment & Repair, Shop & Service Management. Every Certified Electronics Technician (CET) candidate must pass the Associate exam before they can qualify to sit for the full Journeyman certification. Once a technician has completed the four year term, they should specialize and take a Journeyman option. A CETa study guide can be purchased at eta-i.org.

Course Cost: $475

Certification: ETA International Associate Certified Electronics Technician (CETa)

Certification Test:  included in the price of the workshop

Session # RFIM

**Radio Frequency Interference Mitigation**

Wednesday, March 6 - Thursday, March 7 \* 8:30am-5:30pm

Instructor: Don Huston, GES Training Manager, Bird Technologies Group

*This is a multi-day course that takes place on Wednesday and Thursday.*

This course is for anyone who is involved with interference hunting in radio services. It will provide theoretical and practical fundamentals needed to effectively identify and locate radio frequency interference issues in any band or network. It begins with an overview of basic RF principles, signal types, propagation and spectrum allocation. Practical applications include interference hunting tools, the use of monitoring receivers, spectrum analyzers and drive test tools. Methods of radiolocation (direction finding) and signal analysis will be demonstrated using live signal sources and hands-on exercises.

Course Cost: $899 (through 11/8); $949 (11/9 – 3/8)

Certification: ETA International Radio Frequency Interference Mitigation (RFIM)

Certification Test:  included in the price of the workshop

Session # PIM

**PIM Testing Training**

**Brought to you by Dover Telecommunication Services**

Thursday, March 7 \* 8:00 am – 5:30 pm

Instructor: Tom Dover, President, Dover Telecommunications Services

Passive Intermodulation (PIM) testing is now a standard for many wireless carriers for site commissioning and certification. This one-day course will discuss why PIM has become such a hot topic in some wireless circles. Students attending this training will learn why intermodulation is such a problem in wireless applications and continues to increase with new radio installations. Attendees will learn what PIM is, how it is tested and the difference between PIM testing and other antenna testing techniques. Prerequisites include a general wireless knowledge. Antenna construction practices and antenna line sweep testing are a plus, but not required. Items covered include:

* Introduction to PIM: Term & definitions, standards defined, PIM defined, why power is important, fixed frequency testing, swept frequency testing.
* Technology Overview: dB – dBm – dBc, intermodulation overview, spurious emissions, loads and antennas, PIM vs line sweep, methods & procedures
* How PIM is created: Internal PIM sources, external PIM sources, multiple PIM sources, torque specifications, cleanliness
* PIM Testing: Safety review – teams, setting up equipment, equipment verification, load vs antenna, taking an outage, conducting the test.
* Results – Interpretation: Spectrum analysis, reading the numbers, what they mean, troubleshooting, creating reports

Course Cost: $495 (through 11/8); $549 (11/9 – 3/8)

Certification: ETA International Passive Intermodulation (PIM)

Certification Test:  included in the price of the workshop

Session # ITS

**Cybersecurity and Information Technology Specialist Training**

Wednesday, March 6 and Thursday, March 7, from 8:00 am – 5:30 pm

Friday, March 8 \* 9:00 am – 12:00 pm

Instructor: Chuck Brooks, Managing Director, eITPrep LLP, and Vice President, Educational Technologies Group

This is a multi-day course that takes place on Wednesday, Thursday, and Friday.

STUDENTS MUST BRING A LAPTOP OR TABLET TO THE CLASS.
The workshop will prepare attendees to challenge the new ITS certification exam from the ETA International. Each exam domain will be unpacked to provide the attendee with a complete defense in depth strategy for implementing Cyber Security solutions to any network environment - including wireless networks. They also will be aware of attack vectors, tools and techniques used to Pentest network computing environments.

After completing this course, the student will be able to:

1. Have an in depth understanding of all ITS domains:
2. Achieve the understanding of Hardware and Software of Network Security.
3. Have a clear understanding of Security in relation to Wireless Networks.
4. The basic understanding of Device Security such as Bluetooth and IoT.
5. A detailed understanding of Software exploitation and Vulnerabilities.
6. Have a clear understanding of Operational Polices, Standards, and Risk Assessment.
7. Have an understand of Disaster Recovery and Computer Forensics
8. Understand the fundamentals of Cryptography and its relationship with IT infrastructure.
9. Understand Social Engineering attacks and countermeasures in depth.

Course Cost: $899 (through 11/8); $949 (11/9 – 3/9)

Certification: Information Technology Security (ITS)

Certification Test: included in the price of the workshop