TRAINING PROGRAM OF INSTRUCTION (TPI)

FOR

DINFOS-BTVEM

BASIC TELEVISION EQUIPMENT MAINTENANCE COURSE

Approved by:

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Commandant Defense Information School

Supersedes TPI dated 1 August 2008

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TRAINING PROGRAM OF INSTRUCTION

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TRAINING PROGRAM OF INSTRUCTION

Preface

TRAINING PROGRAM OF INSTRUCTION FILE NUMBER (TPFN): DINFOS-BTVEM

TITLE: Basic Television Equipment Maintenance Course

TRAINING LOCATION: Defense Information School, Fort Meade, MD

PURPOSE: To provide basic, entry-level concepts and practical skills required to maintain, operate and repair audio and visual information systems, including radio and television equipment systems, in support of Army, joint and combined operations.

TRAINING METHODOLOGY: Resident

COURSE DESCRIPTION: The course provides instruction in the fundamentals of electronics, to include: basic circuits, direct current, alternating current, solid state electronics, power supplies, amplifier circuits, digital circuits, and the principles of troubleshooting. The students then apply their new skills in the maintenance and repair of broadcast television and radio equipment, including the following functional areas: computers and networking, fundamentals of television, cameras and media storage to include non-linear editing, audio, conference room maintenance, studios, transmission systems, concluding with system integration and installation basics.

SERVICE PREREQUISITES:

Service	Prerequisites:	Notes:
USA		
Enlisted	E-1 through E-6	Minimum EL score of 110 on the ASVAB; have normal color vision; profile series: PULHES 212221; cannot experience acrophobia, claustrophobia, or vertigo; and be able to lift 75 pounds.
International		
Must have an English Comprehension Level (ECL) of 75, have normal color vision, cannot have acrophobia, be claustrophobic, or have vertigo.		
Interagency		
Student's pay-grade, duty position description, and selection in accordance with specific agency guidance, policy and procedures.		

COURSE PREREQUISITES: See Army Training Requirements and Resources System (ATRRS) website (https://www.atrrs.army.mil/atrrscc/). Use school code 212.

CLASS SIZE:

Maximum	8 students
Minimum	4 students
Annual capacity	54 students

COURSE LENGTH:

Academic Hours	977 hours
Administrative Hours	15 hours
Total Course Length	992 hours, 124 days

TYPE/METHOD OF INSTRUCTION:

Lecture (L)	218 hours
Demonstration (D)	67 hours
Performance Exercise (PE)	495 hours
Field Trip (FT)	8 hours
Exam Performance (EP)	141 hours
Written Exam (EW)	48 hours
Administrative (AD)	15 hours

COURSE MEASUREMENT PLAN: Located in the Course Training Standard.

TRAINING START DATE: 16 November 2016

ENVIRONMENTAL IMPACT: No environmental impact.

MANPOWER: The Inter-service Training Review Organization (ITRO) formula was used to determine the number of instructors required. The Course Design Resource Estimate (CDRE) contains this information.

EQUIPMENT AND FACILITIES: The Course Design Resource Estimate (CDRE) contains this information.

TRAINING DEVELOPMENT PROPONENT: Defense Information School, Directorate of Training, Fort George G. Meade, MD 20755

REFERENCES: Located in the last section of this TPI.

SAFETY FACTORS: Routine

POC: Course Development Office, nichole.s.meade.civ@mail.mil, (301) 677-4257.

FUNCTIONAL AREA 1

FUNDAMENTALS OF ELECTRONICS

TRAINING OUTCOMES:

UNIT 001 INTRODUCTION TO ELECTRONICS: Students will identify and comply with electronic safety applicable to electronics by learning to recognize and avoid potential dangers when working around electricity. They will also learn about safety measures relating to HAZMAT, OSHA, Army, and shop standards. Students will perform math operations to calculate and convert between decimal numbers, powers of ten, and metric prefixes.

UNIT 002 VOLTAGE AND CURRENT: Students describe basic electronic circuit theory including atoms, voltage, current, and the electric circuit. Students will identify switches and circuit protection devices, such as switches, fuses and circuit breakers, and describe their characteristics. They will also learn to identify functions of a multimeter and describe a continuity check. Students will identify the purpose of resistors, types of resistors, and their characteristics.

UNIT 003 DIRECT CURRENT: Students will use calculations to troubleshoot a DC circuit by applying Ohm's Law, calculating wattage, current, resistance, circuit value, and voltage. They will also be able to identify the characteristics of DC using Ohm's Law, power, series circuits, and parallel circuits.

UNIT 004 ALTERNATING CURRENT: Students will identify alternating current characteristics such as an AC sine wave, to include its frequency, cycle, and wavelength. They will also identify values of voltage and current and in-phase and out-of-phase voltage waveforms. Students will determine various values of voltage. Students will identify the functions of and perform measurements with AC test equipment including oscilloscopes, function generators, and multimeters. Students will identify inductors and their characteristics such as values, faults, and types of inductors. They will also identify capacitors and their characteristics including values, faults, and types of capacitors. Students will identify filter circuits and their characteristics. Students will use calculations to troubleshoot reactive circuits by defining impedance, resonance, and reactance and determining values of RL, RC, and RCL series and parallel circuits.

UNIT 005 SOLID STATE ELECTRONICS: Students will identify transformers, their purpose, types of transformers, and their faults and values. Students will identify the purpose of a relay circuit, types of relay circuits, and their values and faults. Students will identify the purpose of a diode circuit, types of diode circuits, and their values and faults.

UNIT 006 POWER SUPPLIES: Students will identify the purpose of a transistor circuit, types of transistor circuits, and their values and faults. Students will describe the signal flow for power supplies.

UNIT 007 AMPLIFIER CURRENTS: Students will identify the purpose of a transistor amplifier circuit, types of transistor amplifier circuits, and their values and faults.

UNIT 008 OSCILLATOR CURRENTS: Students will identify the purpose of an oscillator circuit, types of oscillator circuits, and their values and faults. They will trace signal flow through an oscillator circuit and describe the operation of a sawtooth generator.

UNIT 009 DIGITAL CIRCUITS: Students will identify digital circuits, integrated chip characteristics, and different number systems such as binary and hexadecimal.

UNIT 010 PRINCIPLES OF TROUBLESHOOTING: Students will identify principles of troubleshooting including sources, symptoms, general checks, and using diagrams and schematics.

FUNCTIONAL AREA 2

COMPUTERS AND NETWORKING

TRAINING OUTCOMES:

UNIT 001 COMPUTERS AND NETWORKING: Students will identify basic computer principles including computer components, input and output devices, storage drives operating systems, and file maintenance. Students will perform computer maintenance by assembling and disassembling computer components, loading operating systems, and troubleshooting computer systems. Students will construct an audio visual/broadcast local area network by configuring workstations and file servers, discuss uninterrupted power principles, construct LAN cables, establish networks and security firewalls, and interface with AV sources. Students will identify principles of LAN/WAN including terminology, networking and file maintenance concepts, and storage.

FUNCTIONAL AREA 3

TELEVISION FUNDAMENTALS

TRAINING OUTCOMES:

UNIT 001 TELEVISION FUNDAMENTALS: Students will use test equipment for signal measurements such as wave form monitors, vectorscopes, oscilloscopes, function generators, and digital measurement devices. They will identify basic terminology of audio and video signals such as format, compression, and encoding and be able to distinguish between analog and digital audio and video signals. Students will identify basic principles of transmissions by defining basic transmission terminology, and modulation as well as identify usable frequency spectrum such as AM, FM, and TV. They will describe AC power fundamentals including grounding, international power, single phase 110 and 220, polarization, and breaker and fuse panels. Students will identify corrosion control fundamentals, identify potential hazards, and describe corrective and preventative measures.

FUNCTIONAL AREA 4

CAMERAS AND MEDIA STORAGE

TRAINING OUTCOMES:

UNIT 001 CAMERAS AND MEDIA STORAGE: Students will learn to maintain a still and video camera and identify basic principles of cameras to include optical systems, light, lens systems, charge-coupled devices, and digital signal processing principles. They will learn to troubleshoot a camera. Students will maintain media storage by performing operation and diagnostic checks, file maintenance and identify media storage such as VTRs, hard drives, flash storage, file servers, and cloud-based storage. Students will identify principles of non-linear editing as well as learn to perform non-linear editing and maintain a non-linear editing system.

FUNCTIONAL AREA 5

AUDIO SYSTEMS

TRAINING OUTCOMES:

UNIT 001 AUDIO SYSTEMS: Students will learn how to set up, operate, and maintain an audio system by performing operation checks and troubleshooting studio systems. Students will identify principles of audio systems such as audio components, signal processing, block diagrams, impedance matching, signal principles, audio connectors, compression, digital audio interfacing, and audio distribution systems. They will identify the principles of an audio automation system and learn to perform maintenance on an audio automation system to include software, hardware, media file maintenance, and operation checks of audio automation systems. Students will learn to assemble an audio system by reviewing system layouts and diagrams, installing equipment to racks, installing AC power to racks, and preparing, installing and connecting cables and wiring. They will learn to construct audio cables. Students will configure audio consoles by identifying the principles of audio console operations and performing operational checks of audio consoles.

FUNCTIONAL AREA 6

CONFERENCE ROOM MAINTENANCE

TRAINING OUTCOMES:

UNIT 001 CONFERENCE ROOM MAINTENANCE: Students will learn to maintain a multimedia conference room by understanding multimedia systems such as cameras, lighting, microphones, video and computer displays, and control systems. They will also learn procedures for adjustments and alignments of the systems and different types of display devices. Students will learn to set up, operate, and maintain a VTC system using manuals from the manufacturer and from the Video Teleconference Certification Course. They will identify principles of VTC software, types of VTC transmission methods, how to establish a VTC across a network, how to monitor the VTC, and how to resolve connectivity issues. Students will identify principles of display devices with procedures for adjustments and alignments and identifying different types of display devices including projectors, flat panels, and other emerging technologies.

FUNCTIONAL AREA 7

STUDIO SYSTEMS

TRAINING OUTCOMES:

UNIT 001 STUDIO SYSTEMS: Students will learn to operate and maintain a studio system by performing an operation check and troubleshooting the studio system. They will also identify principles of studio systems such as safety considerations, types of studios, components and purpose of master control, studio automation, signal flow, studio audio and lighting, camera color matching, and teleprompters. Students will also perform alignments on a studio system with camera color matching and configuring component and system settings.

FUNCTIONAL AREA 8

TRANSMISSION SYSTEMS

TRAINING OUTCOMES:

UNIT 001 TRANSMISSION SYSTEMS: Students will operate and maintain a transmitter system by performing operational checks of a transmitter, utilizing transmission test equipment, setting frequency and output power, troubleshooting a transmitter system, and recording readings into maintenance logs. They will identify principles of transmission such as analog and digital RF transmissions, world-wide transmission standards, and the test equipment associated with transmission. Students will learn to install a basic cable head-end system and identify its components and functions. Students will learn to establish a satellite link by conducting a site survey setting up the satellite dish, and performing dish alignments while adhering to safety precautions. They will identify principles of satellite transmission systems including types of digital modulation, the purposes and functions of an IRD, and different satellite transmission/receiver devices. Students will learn to erect a wire antenna system using guylines to secure it while adhering to safety precautions. They will establish a microwave link by conducting a site survey, setting up the microwave system, and verifying the link while adhering to safety precautions. They will identify principles of microwave transmission to include safety precautions, microwave spectrums, types, functions and applications of microwave links, the environmental considerations for microwave transmissions, and multipoint microwave distribution systems.

FUNCTIONAL AREA 9

SYSTEM INTEGRATION AND INSTALLATION BASICS

TRAINING OUTCOMES:

UNIT 001 SYSTEM INTEGRATION AND INSTALLATION BASICS: Students will identify installation practices to include safety boards, patch panels, hardware, maintenance of systems, equipment mounting and cabling audio visual equipment, and general installation practices. They will perform soldering procedures by identifying principles of soldering, types of solder, safety procedures, American Wire Gauge (AWG) sizes, and soldering and desoldering components to a circuit board. Additionally they will construct soldered cable connections such as XLR, TRS, along with crimp connectors such as BNC, F-type, and LAN connectors. Students will perform integration practices by preparing, fabricating, testing, installing and dressing cables, and grounding the system. To accomplish this task they will be required to correctly use tools and parts, properly install connectors, and perform a final operational check.

FUNCTIONAL AREA 10

COURSE ADMINISTRATION

TRAINING OUTCOMES:

UNIT 001 COURSE ADMINISTRATION: During this time students records will be created, updated, and archived. Students perform in-processing and out-processing that includes receiving a course and school orientation, receiving information assurance training for proper computer and network use, completing a mid, mid-2 and an end-of-course survey, and the course culminates with a graduation ceremony.

References

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