

Advanced Analog Electronics Technology(EM-01)

An intensive 5 week course covering the following topics:

- Digital and analog meters.
- Oscilloscope operations.
- AC and DC circuit analysis.
- Diode circuits.
- Transistor circuits.
- Field Effect Transistors, Silicon Controlled Rectifiers and Operational Amplifier configurations.

Students analyze and troubleshoot over 30 various circuit configurations after building them on an experiment test console.

Experiments include:

Power Supplies, Frequency Filters/Limiters, Diode Circuits Transistor Amplifier, Voltage Dividers/Regulators, Resonant Circuits, and Signal Generators,

Recommended pre-reporting studies/tips. Extensive knowledge of Ohm's Law as well as Series and Parallel circuit analysis.

Prerequisites. None

Point of Contact. You can contact the resident supervisor for specific questions regarding course content and program of instruction at 757.856.2223.

Advanced Digital Electronics Technology (EM-02)

An intensive 4-week course located in Canfield Hall, Room 227A that is designed to provide Coast Guard personnel (E4 through E9) with the technical skills required to operate, maintain and troubleshoot electronic equipment incorporating digital technology that is in use throughout the Coast Guard today.

Topics of Instruction include:

1. Introduction to Digital Electronic Circuits
 - Digital Electronic Hardware, Test Equipment, Buffers and Inverters, Electrostatic Devices, 555-Timer
2. Digital Logic Functions
 - AND, OR, NAND, NOR, & XOR Gates
3. Combinational Logic Functions
 - Logic Families
 - Numbering Systems (Binary, Octal, Decimal, Hexadecimal)
 - Base 10 (Decimal) to Binary, Binary to 7-Segment Display Conversion
 - 4-BIT Comparator

4. Flip-Flop Circuits

- RS, JK, Clocked RS, D-Type, & Master-Slave Flip-Flops

5. Register & Memory Circuits

- 4-BIT & 8-BIT Storage Registers, 4-BIT Shift & 8-BIT Shift Registers
- 64-BIT Memory Circuit

6. Arithmetic Counting Circuits

- Ripple, UP, & DOWN Counters
- 4-BIT Adders & 4-BIT Subtractors

7. Conversion and Data Circuits

- Data Selector & Data Distribution Circuits
- Digital to Analog Conversion Circuits

8. Microprocessor Circuits

- Basic 8085 Microprocessor Circuits and Operation
- Interfacing with & Troubleshooting the 8085 Microprocessor

9. Final Course Practical will include:

- Construction of an actual 8085 Microprocessor (Proper soldering techniques will have to be demonstrated)
- A demonstration of the proper operation of their 8085 Microprocessor
- Troubleshooting of three faults install into their 8085 Microprocessor

Prerequisites: None

Recommended pre-reporting studies/tips: Perspective students may go to the following “howstuffworks” website and read about How Boolean Logic Works.

<http://computer.howstuffworks.com/boolean.htm>

Point of Contact: You can contact the resident supervisor for specific questions regarding course content and program of instruction at (757) 856-2223.

Fiber Optics Maintenance Technician (EM-03)

PURPOSE: This course covers:

- The history of fiber optic development
- Theory of lightwave communication
- Characteristics of optical fiber cable
- Optical fiber cable terminations Power meters and optical fiber cable testing
- Optical fiber cable installation
- Fusion splicing
- Mechanical splicing
- Use of the optical time domain reflectometer (OTDR)

Each student will learn how to use the various tools of the trade to make fiber optic ST/SC connections and proper use of the mechanical and fusion splice. Students shall also determine the quality of their fiber optic connections and splices with the use of a fiberscope and fiber optic light source and power meter. Instructions shall also be given on the proper use of the optical time domain reflectometer (OTDR) for troubleshooting a fiber optic installation.

LOCATION: COGARD TRACEN YORKTOWN – Canfield Hall Rm 324

DURATION: 5 DAYS

PREREQUISITES: None

Point of Contact. You can contact Mr. Larry Armstrong for specific questions regarding course content and program of instruction at 757.856.2452

Introduction to Programmable Logic Controllers (EM -4)

PURPOSE: This course covers:

- Identify the various components associated with a programmable logic controller.
- Define the basic operation of a programmable logic controller.
- Locate and Isolate faulty components in an operational PLC.
- Edit a PLC ladder logic program.

• Troubleshoot a PLC controlled system. Students learn how to determine proper operation, create and edit programs, and

troubleshoot a PLC ladder-logic program using the Allen Bradley SLC-500 and GE FANUC Series 30-90 while using manufactures software. **LOCATION:** COGARD TRACEN

YORKTOWN – Canfield Hall Rm 324 **DURATION:** 10 DAYS **PREREQUISITES:**

Successfully completion of Advance Digital Electronics

Technology (EM02) **Point of Contact.** You can contact Mr. Larry Armstrong for specific questions regarding course content and program of instruction at 757.856.2452

378 Hero Class Console Course (EM -04A)

Purpose: This course provides an in-depth working knowledge of the 378' WHEC main propulsion control console, turbine fuel control, and associated systems . Operation, maintenance, and troubleshooting of the Micronet PLC and turbine fuel control system.

LOCATION: COGARD TRACEN YORKTOWN

DURATION: 15 DAYS PMIS 501- 554

ELIGIBILITY REQUIREMENTS: E-6 and E-7 Electrician's Mates s assigned to 378' WHEC's, E-5 thru E9 EM assigned to a NESU, ASSIST or MAT Teams. **PREREQUISITES:** EM01, EM02

Point of Contact. You can contact the resident supervisor for specific questions

regarding course content and program of instruction at 757.856.2907 or 757.856.2909

Power Generation and Speed Controls Course (EM -05)

PURPOSE: To train Electrician Mates the operation, maintenance, and troubleshooting of electronic speed controls, analog/ digital load sharing, and voltage regulation. **LOCATION:**

COGARD TRACEN YORKTOWN - Elbert Hall, room 118

DURATION: 7 DAYS PMIS 501-555 **PREREQUISITES:** EM E-5 to E-9 assigned to EM billets on 210' and 270' WMEC's, 378' WHEC, WLB- 225, WLM, CST, NESU, and MAT Teams

Point of Contact. You can contact the resident supervisor for specific questions regarding course content and program of instruction at 757.856.2737

Caterpillar 3508B Electronic Fuel Injection and Engine Monitoring System Course (EM -05A)

PURPOSE: To train Electrician Mates & Machinery Technician in the operation, maintenance, and troubleshooting of Caterpillar Electronic Technician software, Electronic Engine Control, Electronic Generator Control Panel, and Programmable Relay Control Module.

LOCATION: COGARD TRACEN YORKTOWN - Elbert Hall, room 118

DURATION: 5 DAYS PMIS 501-558

PREREQUISITES: E-5 thru E9 assigned to a EM or MK billets on WLB-B 225, CST, NESU, ASSIST and MAT Teams.

Point of Contact. You can contact the resident supervisor for specific questions regarding course content and program of instruction at 757.856.2737.

MK-27 GyroCompass System(EM-20)

A 2 week course located in Canfield Hall, room 325 that is designed to teach MK-27 gyrocompass and distribution system:

- Theory of operation.
- Maintenance procedures.

- Troubleshooting and repair to the component level. Each student must perform the associated practicals for maintenance and operation. **Recommended pre-reporting studies/tips.** None.

Prerequisites. Students must have successfully completed EM-01. **Point of Contact.** You can contact the resident supervisor for specific questions regarding course content and program of instruction at 757.856.2223.

270 WMEC Machinery Plant Control & Monitoring System (EM-25)

This 4 week course located in Elbert Hall, room 118 is designed to teach 270 WMEC propulsion control console:

- Theory of operation.
- Maintenance procedures.

- Control system troubleshooting and repair. Students perform hands-on practical exercises and training on a functioning console. **Recommended pre-reporting studies/tips.** None. **Prerequisites.** Students must have successfully completed EM-01 and EM-02. **Point of Contact.** You can contact the resident supervisor for specific questions regarding course content and program of instruction at 757.856.2877.

MK-29 MOD-1 GyroCompass System(EM-26)

This 2 week course located in Canfield Hall, room 309 is designed to teach students:

- Theory of operation.
- Maintenance procedures.

- Gyrocompass and distribution system troubleshooting and repair. **Recommended pre-reporting studies/tips.** None. **Prerequisites.** Students must have successfully completed EM-01 and EM-02. **Point of Contact.** You can contact the resident supervisor for specific questions regarding course content and program of instruction at 757.856.2223.

110 "A" and "B" WPB Control Systems(EM-32)

This 1 week course located in Martin Hall, room 109-E is designed to teach students 110 "A" and "B" WPB propulsion control system:

- Theory of operation
- Maintenance procedures.
- Troubleshooting and Repair.

Students perform hands-on practical training and exercises using a functional system simulator.

Recommended pre-reporting studies/tips. None. **Prerequisites.** Students must have successfully completed EM-01. **Point of Contact.** You can contact the resident supervisor for specific questions regarding course content and program of instruction at 757.856.2223.

110 "C" WPB Machinery Control & Alarm System(EM-33)

This 2 week course located in Canfield Hall, room 318 is designed to teach students 110 "C" WPB propulsion control system:

- Theory of operation.
- Maintenance procedures.
- Troubleshooting and Repair.

Students perform hands-on practical training and exercises using a functional system simulator.

Recommended pre-reporting studies/tips. None. **Prerequisites.** Students must have successfully completed EM-01 and EM-02. **Point of Contact.** You can contact the resident supervisor for specific questions

regarding course content and program of instruction at 757.856.2223.