LEARNING OBJECTIVES FOR THE FA4 EXAM

The technician shall understand the concepts, terms, and phrases related to:

1. **A/C Line Voltage**
   a. Components and terms
   (1) Single phase
   (2) Three phase
   (3) Neutral wire
   (4) Ground wire
   (5) Bonding
   (6) Inrush / startup current
   (7) Soft start
   (8) Frequency
   (9) Sine wave
   (10) Photo resistor
   (11) Resistor
   (12) True Power
   (13) Prime Movers
   (14) Voltage Drop
   (15) Testing
   (16) Hertz

   b. Application and Troubleshooting
   (1) Wiring connections
   (2) Wiring methods
   (3) Repair techniques
   (4) Receptacle types
   (5) Wire routing
   (6) Diagnostic tools
   (7) NFPA standards
   (8) Effects of voltage drops on components
   (9) Portable Equipment
   (10) A. Maximum voltage supplied to Installations
   (11) A. Mounting height in wet locations
   (12) B. Switching
   (13) (2) Light masts
   (14) (3) Wiring
   (15) (1) Receptacles
   (16) A. Connection to frame rails

   c. Installations
   (a) Full load test
   (b) Out of Service

2. **System Knowledge**
   a. Circuit drawings
   (1) Resistor
   (2) Diode
   (3) Rectifier
   (4) Transistors
      A. Base
      B. Emitter
      C. Collector
   (5) Thermistors
   (6) Wire Splice
   (7) Pulse Width Modulation

   b. Circuit protection
   (1) Over current protection
   (2) Circuit rating
   (3) Ground fault circuit interrupters
   (4) Wet/dry listings
   (5) Circuit breaker switches

   c. Transfer switches
   (8) Capacitor
   (9) Pressure Governor
   (10) Potentiometer
   (11) AND gate
   (12) OR gate
   A. Conductors
   B. Polarity verification
   C. Circuits
   D. Remote power Distribution
   E. Transfer switch
   F. Grounding
   G. Testing
   h. Crimping tools
   i. Component information
   (1) Capacitor
   (2) relays
   (3) Power transmission
   (4) Wire Connections
   (5) Interlocks

3. **Sources**
   a. Shoreline power
   b. Invertors & converters
   (1) Dynamic power
   (2) Static power
   (3) Drives
   (4) Generator Governors
   (5) Generator Diagnostics
   (6) Drive Diagnostics
   (7) Generator poles
   (8) Hydraulic generators
   A. Capacitor effects
   B. PTO inspection
   C. Filters
   D. Hose reversal
4. **Accessories**
   a. Cable reels
   b. Scene lighting
      1. Requirements
      2. Interlocks
      3. Light masts
      4. Remote towers
      5. Operational testing
   c. Rescue tools
      1. Quik-connect requirements
      2. Battery powered
   d. Hydraulic power unit

5. **Low Voltage Systems**
   a. Load managers/sequencers
      1. Setup
         A. Minimum continuous loads
         B. Programming
         C. Prioritizing
         D. Amp loads
         E. Emergency lighting sequencer
      2. Troubleshooting
         A. Shedding loads
         B. Interlocks
         C. Alarms
         D. Voltage drop testing
      3. Testing
         A. Electromagnetic interference
   b. Data Recorders
      1. Same line rate
      2. Memory size
      3. Data recorded
   c. Seat belt warning system
      1. Warning Devices
         A. Audible
         B. Visual
      2. Indications

6. **Multiplex Systems**
   a. Components
      1. V-MUX modules
         A. Hercules node
         B. Vista node
         C. Mini node
         D. Deutsch connectors
      2. Sensors
         A. Active
         B. Passive
   b. Interface
      1. Fast idle function
      2. PEER to PEER
   c. Programming
      1. Interlocks
      2. Control Module
      3. Reports
      4. Communication
   d. Terminology
      1. CAN
   e. Troubleshooting
      1. VMUX
      2. Welding
      3. CAN
   f. System Knowledge
      1. Wiring
      2. Amount of components
      3. Effect of AC voltage
   g. Engine Controls
      1. Throttle position sensor
      2. Electronic unit injector
      3. Sensors
      4. ECU
      5. D.P.F. Systems
   h. Vehicle data recorder
   i. Ground connections

7. **Operations**
   a. Load minder
   b. Water tank level indicating system
   c. Rotation limiting
   d. Pressure governor
   e. Transducers