

# TECHNOLOGY INTEGRATION/3: SECURITY, HVAC, & OTHER SYSTEMS (180 Hours)

Course No.: 72-85-90

## COMPETENCY CHECKLIST

Student Name \_\_\_\_\_

Teacher Name \_\_\_\_\_ School Site \_\_\_\_\_

Start Date \_\_\_\_\_ Completion Date \_\_\_\_\_ Certificate Date \_\_\_\_\_

Teacher Signature \_\_\_\_\_ Student Signature \_\_\_\_\_

(Signatures verify completion of course competencies)

### A. INTRODUCTION AND SAFETY (4 hrs)

- \_\_\_\_\_ 1. Scope and purpose of course
- \_\_\_\_\_ 2. Course content as part of Linked Learning
- \_\_\_\_\_ 3. Classroom policies and procedures
- \_\_\_\_\_ 4. Jobs w/impact on TI installers
- \_\_\_\_\_ 5. Promoting gender equity in field
- \_\_\_\_\_ 6. OSHA laws governing technicians
- \_\_\_\_\_ 7. Impact of EPA legislation on industry
- \_\_\_\_\_ 8. Proper disposal of hazardous waste
- \_\_\_\_\_ 9. NEC & its role in safeguarding TI installers
- \_\_\_\_\_ 10. MSDS as it applies to the TI field
- \_\_\_\_\_ 11. LEED Green Building Rating System
- \_\_\_\_\_ 12. Codes that apply to the TI field
- \_\_\_\_\_ 13. CA Title 24 Energy Efficiency Standards
- \_\_\_\_\_ 14. First aid/emergency procedures
- \_\_\_\_\_ 15. Safety test

### B. RESOURCE MANAGEMENT REVIEW (1 hr)

- \_\_\_\_\_ 1. Review listed definitions
- \_\_\_\_\_ 2. Management of listed resources
- \_\_\_\_\_ 3. Examples of effective management
- \_\_\_\_\_ 4. Benefits of effective resource management
- \_\_\_\_\_ 5. Economic benefits and liabilities

### C. HOME SECURITY AND ACCESS CONTROL SYSTEMS\* (50 hrs)

- \_\_\_\_\_ 1. Define listed terms related to topic
- \_\_\_\_\_ 2. Home security and fire alarm system
- \_\_\_\_\_ 3. Regulations for security and access control
- \_\_\_\_\_ 4. Remote access vs. remote control
- \_\_\_\_\_ 5. Advantages of a zoned security system
- \_\_\_\_\_ 6. Bypass mode with a zoned security system
- \_\_\_\_\_ 7. Wired vs. wireless home security systems
- \_\_\_\_\_ 8. Functions from a security system keypad
- \_\_\_\_\_ 9. Sensors and where used in home system

- \_\_\_\_\_ 10. Security phone dialer works with RJ-31X jack
- \_\_\_\_\_ 11. Electromagnetic and cipher locks
- \_\_\_\_\_ 12. Telephone use for remote gate access
- \_\_\_\_\_ 13. Monitoring a home remote access system
- \_\_\_\_\_ 14. Primary cost drivers for home CCTV
- \_\_\_\_\_ 15. Features and use of a modulator
- \_\_\_\_\_ 16. Purpose of a quad switcher
- \_\_\_\_\_ 17. Features of garage door infrared sensor
- \_\_\_\_\_ 18. Installation of garage door infrared sensor
- \_\_\_\_\_ 19. Wire permitted in home security system
- \_\_\_\_\_ 20. Specs in ANSI/TIA/EIA 570A addendum
- \_\_\_\_\_ 21. Lux rating for CCTV cameras
- \_\_\_\_\_ 22. Design a home security system layout
- \_\_\_\_\_ 23. Connection of access control devices to panel
- \_\_\_\_\_ 24. Demo installing system w/listed features
- \_\_\_\_\_ 25. Preventative maintenance techniques

### D. HEATING, VENTILATIONS, & AIR CONDITIONING (HVAC) MANAGEMENT SYSTEMS\* (50 hrs)

- \_\_\_\_\_ 1. Define terms related to topic
- \_\_\_\_\_ 2. Regulations for installation of HVAC controls
- \_\_\_\_\_ 3. Industry standards for HVAC control systems
- \_\_\_\_\_ 4. Features of zoned & non-zoned HVAC designs
- \_\_\_\_\_ 5. Features of centralized & distributed systems
- \_\_\_\_\_ 6. Purpose of air handler in an HVAC system
- \_\_\_\_\_ 7. Motorized damper use in zoned HVAC system
- \_\_\_\_\_ 8. Types of fuels used in furnaces
- \_\_\_\_\_ 9. Main components of gas-fired furnace
- \_\_\_\_\_ 10. Theory of operation of an air conditioner
- \_\_\_\_\_ 11. HVAC system & time-of-day programming
- \_\_\_\_\_ 12. Operational features of a heat pump
- \_\_\_\_\_ 13. Operational features of a whole-house fan
- \_\_\_\_\_ 14. Purpose of a duct fan
- \_\_\_\_\_ 15. Preferred locations for installing a thermostat
- \_\_\_\_\_ 16. Operational features of staged thermostat

- \_\_\_ 17. Air conditioner EER
- \_\_\_ 18. How solar panels reduce energy cost
- \_\_\_ 19. Problems associated with duct leakage
- \_\_\_ 20. Components of an oil-fired furnace
- \_\_\_ 21. HVAC system control from remote location
- \_\_\_ 22. Design HVAC control system layout
- \_\_\_ 23. Demo an HVAC zone control system
- \_\_\_ 24. Seasonal preventative maintenance tasks

**E. HOME IRRIGATION AND POOL MANAGEMENT SYSTEMS\*** (30 hrs)

- \_\_\_ 1. Define listed terms related to topic
- \_\_\_ 2. Regulations for irrigation & pool systems
- \_\_\_ 3. Irrigation & pool control system standards
- \_\_\_ 4. Steps for installing irrigation system
- \_\_\_ 5. Concept/purpose of zoned water system
- \_\_\_ 6. Constant-pressure & non-pressurized lines
- \_\_\_ 7. Steps to obtain permit prior to trenching
- \_\_\_ 8. Operation of solenoid control valve
- \_\_\_ 9. Selecting control valve locations
- \_\_\_ 10. Purpose of backflow prevention valve
- \_\_\_ 11. Automatic timers & irrigation controllers
- \_\_\_ 12. Recommended time-of-day programming
- \_\_\_ 13. Purpose of seasonal presets
- \_\_\_ 14. Installing underground PVC irrigation pipes
- \_\_\_ 15. Operation of a sprinkler head
- \_\_\_ 16. Rotary impact vs. gear-driven sprinklers
- \_\_\_ 17. Locations for fixed spray type sprinklers
- \_\_\_ 18. Type of PVC pipe used for pressure lines
- \_\_\_ 19. Features of a booster pump
- \_\_\_ 20. Irrigation control valve wires in ground
- \_\_\_ 21. Proper balance of spa and pool water pH
- \_\_\_ 22. Location/purpose of sump pump & sensors
- \_\_\_ 23. Purpose of water alarm for a residence
- \_\_\_ 24. Planning steps for irrigation system
- \_\_\_ 25. Demo listed irrigation and pool techniques
- \_\_\_ 26. Preventative maintenance techniques

**F. LIGHTING AND LIGHTING CONTROL SYSTEMS\*** (30 hrs)

- \_\_\_ 1. Define listed terms related to topic
- \_\_\_ 2. Regulations for wiring, lighting & systems
- \_\_\_ 3. Standards for wiring, lighting and systems
- \_\_\_ 4. Components in home lighting system
- \_\_\_ 5. Operation of home lighting control system
- \_\_\_ 6. Calculate load/wattage for lighting circuits
- \_\_\_ 7. Demo listed lighting & control techniques
- \_\_\_ 8. Preventative maintenance techniques

**G. MISCELLANEOUS DEVICES\*** (10 hrs)

- \_\_\_ 1. Define listed terms related to topic

- \_\_\_ 2. Regulations for lift systems
- \_\_\_ 3. Industry standards for lift systems
- \_\_\_ 4. Auto control protocol for listed lift systems
- \_\_\_ 5. Demo listed lift system techniques
- \_\_\_ 6. Preventative maintenance techniques
- \_\_\_ 7. Regulations for fireplace ignition systems
- \_\_\_ 8. Standards for fireplace ignition systems
- \_\_\_ 9. Fireplace vs. fire pit
- \_\_\_ 10. Auto control protocol for fireplace ignition
- \_\_\_ 11. Demo fireplace ignition system techniques
- \_\_\_ 12. Preventative maintenance techniques
- \_\_\_ 13. Regulations for skylight, window, auto control
- \_\_\_ 14. Standards for skylight, window, auto control
- \_\_\_ 15. Auto control protocol for skylight/windows
- \_\_\_ 16. Demo skylight, window and system techniques
- \_\_\_ 17. Preventative maintenance techniques

**H. ENTREPRENEURIAL SKILLS\*** (5 hrs)

- \_\_\_ 1. Define entrepreneurship
- \_\_\_ 2. Characteristics of successful entrepreneurs
- \_\_\_ 3. Contributions to the TI field
- \_\_\_ 4. Purpose/components of a business plan
- \_\_\_ 5. Personal goals prior to starting a business
- \_\_\_ 6. Identify sources of monetary investment
- \_\_\_ 7. Licensing requirements for TI field
- \_\_\_ 8. Student as the TI business owner
- \_\_\_ 9. LEED vs. standard business practices