



Program Description

Program Name: Electrician Training - C

Program Fee: \$530.00 (Check for promotions, if any, on our Home Page button: CURRENT PROMOTIONS).

You are entitled to a 15% discount if you pay the program price in full (\$450.00 instead of \$530.00)

Note: The program fee includes the necessary textbook - provided to students in USA at no additional cost.*

Standard Time to Complete Program:** 356 hours

Professional Development Hours (PDHs):** 356.0 hours

Continuous Education Units (CEUs): 35.6

Access Allowed to the Program after Registration: 365 days

Instructor: Houston Industrial Training Institute Staff

7 Calendar Days, No Questions Asked Refund Policy

We are committed to provide an almost zero-risk learning opportunity for prospective students. To this end, we will issue a full refund on monies paid by a student if a refund is asked for within seven calendar days of payment. This applies to all monies paid during the preceding 7 calendar days. Please note that no refund is allowable if the completion certificate has been made available to the student or if more than 7 calendar days have passed.

Notes:

*Students outside the USA may have to cover shipping & handling charges for the textbook.

** Note: The program consists of a number of Learning Modules – all of them are listed below with the standard completion time. The standard-completion-time number shown here is the sum of standard completion time for all of the modules. The standard learning-module completion time is based on the average of time taken by actual or study-group students or our judgment in this matter. The standard module-completion time assessment excludes breaks of any kind. Depending upon the experience and educational background of a particular student, the actual time taken by a particular student may be more or less than what is noted here. We give credit for PDHs and CEUs per information provided in this document, and NOT the actual time taken by a particular student.



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Professional Development Hours (PDHs) are equal to the standard learning-module completion time. The corresponding Continuing Education Units (CEUs) are obtained by dividing the standard time by ten.

Who is this program for?

This program is meant for people who seek a good grasp of basic technical aspects of the subject technology at the technician level. The program is based on the US technical practices and covers a wide range of foundational subjects. The program content is in compliance with requirements of the latest version of the **National Electric Code (NEC)**.

Any person who can use email will be able to participate in this program – no additional skills are required. This program covers a broad range of concepts – with a focus on the underlying technology. A career in this field will most likely require you to meet certain licensing, training, and other requirements that can vary by vocation and state. You should check with your state, local government and/or licensing board to find out the requirements that may be applicable to you.

The following career-related information (from US Department of Labor) is provided strictly for your information, planning and reference.

BUREAU OF LABOR STATISTICS

Home | Subjects | Data Tools | Publications | Economic Releases | Students | Beta

Occupational Employment Statistics

BROWSE OES: Occupational Employment and Wages, May 2014
 OES HOME: 47-2111 Electricians

National estimates for this occupation: [Top](#)

Employment estimate and mean wage estimates for this occupation:

Employment (1)	Employment RSE (3)	Mean hourly wage	Mean annual wage (2)	Wage RSE (3)
566,930	0.8 %	\$26.21	\$54,520	0.5 %

Program Structure

This program consists of a number of learning modules. The earlier modules are self-sufficient and no additional textbooks are required. For the later modules, one or more textbooks are necessary – **we provide all of the necessary textbooks, at no additional cost to the student.** The textbook is shipped to the student before he or she starts the learning modules that require the textbook.

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- a. The program provides industry-ready information in a manner that allows almost anyone, with any background, to participate in it. Unlike regular classroom-based learning, this program allows a user to go over the learning materials a number of times and write the test a number of times – this results in an exceptionally high quality of learning.

- c. To augment learning, animations and simulations are provided in many learning modules – allowing the students to interact with the learning materials and get a feeling for the dynamism of technical or scientific concepts.

- d. The program consists of a number of learning modules. Each of the modules consists of learning materials as well as a written test. To pass the program a student has to pass each of the modules. The pass mark is 75% for each module. After going through the learning materials, the student is expected to email the answer sheets for evaluation.

- e. Where necessary, the online modules provide you with a listing of reference material – in case you want to build a personal library or want to do additional research.

Note: Please do not share our program material with others and do not use it for any commercial or professional application. Under all circumstances, we maintain copyright to all of the material presented in the program.

Program Availability: Anytime, from anywhere. This is a totally web-based online program – no physical classroom attendance is required. Prospective students may enroll at anytime from anywhere. Also, students can start and participate in the program at anytime from anywhere.

Program Pre-requisites: Our programs include all of the necessary math and science material relevant to the program. Any person who can use email will be able to participate in this program – no additional skills are required.

How to Register: Visit our Home Page www.HoustonIndustrialTraining.com Please click on the REGISTER button located on the left hand panel. In addition, feel free to ask for clarifications and help by via email: Registrar@HoustonIndustrialTraining.com. Additional informatory material is available via How-To Guide button located on our Home Page.

Help for Registered Students: Students can ask for help at any time via email. Send an email to instructor@HoustonIndustrialTraining.com. In your email, please include your name, your Student Code, your program name, your phone number and your email address. Our aim is to respond to students within two working days.



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Third Party Commercial Interest Disclosure Policy

We do not allow anyone, including the instructors, to solicit any business from the students other than HITI products. Further, no instructor is allowed to present any third party products or software or events to the students. HITI does not allow any third-party compensation related to the learning events or programs.

Required Equipment

1. An ordinary PC (not older than five years).

Note: We do not test our programs on computers other than PC. We have found most of our clients are able to use other computers successfully. If your computer is not a PC, we encourage you to take our FREE sample course to ensure your hardware is compatible with our delivery system. We ask you to do this test BEFORE registering for the program.

2. A good Internet connection. We design most of our instruction pages to download in less than five seconds. Some of the graphics-heavy pages may take longer to download.
3. Adobe Flash Player. Almost all PCs come equipped with this Flash Player. If your computer does not have it, you can download it for free from www.adobe.com.

Listing of included Learning Modules

Basic Industrial Safety

Standard Time to Complete: 6 hours

Learning Outcomes

On successful completion of this learning module, you will be able to:

1. **DESCRIBE** why paying attention to safety is important in an industrial plant.
2. **DESCRIBE** employer and employee responsibilities in reference to personnel safety.
3. With reference to an industrial plant, **IDENTIFY** common hazards and possible protection against them.
4. **EXPLAIN** why special attention is paid to hazards associated with



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Hydrogen Sulfide gas.

5. **DESCRIBE** safety hazards posed by electricity, confined spaces and toxic gases.

6. **SELECT** basic protective equipment for common hazards in an industrial plant.

Basic Hazard Communication

Expected Time to Complete: 10 hours

Learning Outcomes

On successful completion of this learning module, you will be able to:

1. **DESCRIBE** the purpose and the key elements of the Federal Hazard Communication Standard (HCS.) You will also be able to IDENTIFY other common names used to refer to this standard.
2. **DESCRIBE** how a hazardous chemical is identified in a workplace.
3. **DESCRIBE** the purpose and what is meant by the term MSDS. You will also be able to describe the key elements of an MSDS. Using MSDSs, you will also be able to **SELECT** appropriate protective measures when handling chemicals.
4. **DESCRIBE** the nature of the NFPA and HMIS/HMIG hazard communication methods. You will also be able to DESCRIBE what is meant by the terms TLV, PEL, TWA, Acute Effect, Acute Toxicity, Chronic Effect, Chronic Toxicity, Carcinogen, Flammable Liquid, Combustible Liquid, and Chemical Reactivity.
5. **DESCRIBE** the nature of the DOT methods for hazard chemical identification.
6. **DESCRIBE** the necessary training activities required to comply with the Federal Communication Standard (HCS.)



Basic Lockout-Tagout

Standard Time to Complete: 10 hours

Learning Outcomes

On successful completion of this learning module, you will be able to:

1. **DESCRIBE** the key reasons for implementation of lockout-tagout procedures.
2. **DESCRIBE** what is meant by the term "energized equipment." You will be able to list various ways by which equipment "energized state" can occur.



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3. **DESCRIBE** under what conditions lockout-tagout procedures are required. You will also be able to **DESCRIBE** the employer’s responsibilities for implementation of such procedures.

4. **DESCRIBE** the training requirements prescribed by OSHA for lockout-tagout procedures. You will also be able to **DESCRIBE** the prescribed worker training requirements under OSHA’s regulations.

5. **DESCRIBE** the key items that need to be considered for electric power lockout-tagout systems. In reference to the electrical requirements, you will be able to **DESCRIBE** what is meant by the term “qualified employees;” you will also be able to **DESCRIBE** the responsibilities of such employees.

6. **DESCRIBE** the ten general procedural steps, outlined in the learning module, for implementation of Lockout-Tagout Procedure.



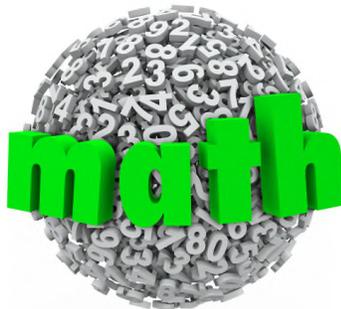
Math for Technicians and Operators

Standard Time to Complete: 20 hours

Learning Outcomes

On successful completion of this learning module, you will be able to:

1. **ADD, MULTIPLY, DIVIDE**, and **SIMPLIFY** fractional numbers; you will also be able to **ADD, MULTIPLY, DIVIDE**, and **SIMPLIFY** decimal numbers; you will also be able to **CONVERT** fractional numbers into decimal numbers and vice versa.
2. **CALCULATE** areas and volumes of simple figures.
3. **MANIPULATE** and **WORK WITH** simple equations.
4. **CREATE** graphical representations of two-dimensional numeric relationships.
5. **CALCULATE** percentage values of simple quantities.
6. **CONVERT** one measurement unit into another measurement unit.



Physics for Technicians 1

Standard Time to Complete: 20 hours

Learning Outcomes

On successful completion of this learning module, you will be able to:

1. **DESCRIBE** what is meant by the English and the SI measurement systems.



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You will also be able to **STATE** some common conversion factors.

2. **DESCRIBE** what is meant by the terms: mass, weight, matter, weight density, and specific gravity.

3. **DESCRIBE** what is meant by the terms: Buoyancy, and Archimedes' principle.

4. **DIFFERENTIATE** between heat and temperature. You will also be able to **DESCRIBE** the following concepts: Fahrenheit scale, Celsius scale, Rankine scale, and Kelvin scale. You will also be able to **CONVERT** a given temperature in any scale to any of the three other scales.

5. **DIFFERENTIATE** between the terms sensible heat and latent heat. You will also be able to **DESCRIBE** the terms: thermal conductivity, heat convection, heat radiation, and heat conduction.

6. **DESCRIBE**, using latent heat concepts, how water at room temperature is converted into superheated steam.



Physics for Technicians 2

Standard Time to Complete: 20 hours

Learning Outcomes:

On successful completion of this learning module, you will be able to:

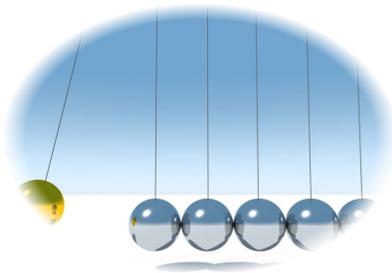
1. **DESCRIBE** the meaning of and **DIFFERENTIATE** between the terms: Mass, weight, and energy. You will also be able to **DIFFERENTIATE** between various types of energy such as potential energy, kinetic energy, electrical energy, thermal energy, etc.

2. **DESCRIBE** how pressure is exerted by various forms of matter, and **DIFFERENTIATE** between various forms of pressure measuring units such as psig, psia, inches of water, head, inches of mercury – pressure, inches of mercury – vacuum, etc.

3. **DESCRIBE** how gases exert pressure. You will also be able to **DESCRIBE** the three gas laws, including the ability to use the formula $PV=RT$ to calculate any of the variables, provided the other variables are given.

4. **DESCRIBE** how liquids exert pressure and what is meant by static pressure and how it varies according to the liquid depth.

5. **DESCRIBE** the nature of a manometer and how it can be used to measure pressure and vacuum.



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6. **DESCRIBE** what is meant by the term “Vapor Pressure” and how it varies with liquid temperature.

Physics for Technicians 3

Standard Time to Complete: 40 hours

Learning Outcomes:

On successful completion of this learning module, you will be able to:

1. **DESCRIBE** what is meant by the terms: Work, Energy and Power; also **DESCRIBE** how these concepts relate to each other.

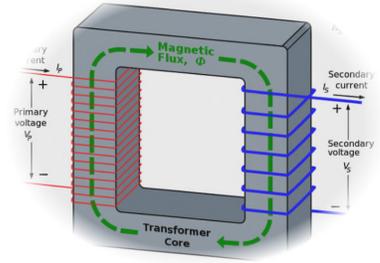
2. **DESCRIBE** what is meant by the term Force Transformers; also **DIFFERENTIATE** between different classes of levers, and **ANALYZE to IDENTIFY** similarities and differences between levers and pulleys.

3. **DESCRIBE**, in terms of electron flow, how electric current flows. You will also be able to **DESCRIBE** what forces the current to flow.

4. **DESCRIBE** how electromotive force (EMF) can be generated in a number of different ways.

5. **DESCRIBE** how alternating current (AC) is generated. You will also be able to **DIFFERENTIATE** between alternating current (AC) and direct current (DC.)

6. **SOLVE** simple numerical problems relating to electric circuits. You will also be able to **DESCRIBE** what is meant by the term “electric power” and how to **CALCULATE** it.



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Electrical Safety

Estimated Time to Complete: 20 hours

Learning Outcomes

On successful completion of this learning module, you will be able to:

1. **IDENTIFY** the key components of a basic electric circuit. You will also be able to **EXPLAIN** the function of key components of a basic electric circuit.
2. **DESCRIBE** the common hazards posed by electricity. You will also be able to **STATE** the protective measures that should be taken by workers and electricians.
3. **DESCRIBE** what is meant by the term “grounding,” and how it is accomplished.
4. **DESCRIBE** how an improperly grounded system can become hazardous for workers.
5. **DESCRIBE** how a properly grounded system works and provides safety for workers and electricians. You will also be able to **DIFFERENTIATE** between a Service Ground and an Equipment Ground.
6. **DESCRIBE** how a Ground Fault Current Interrupter (GFCI) works and provides safety.



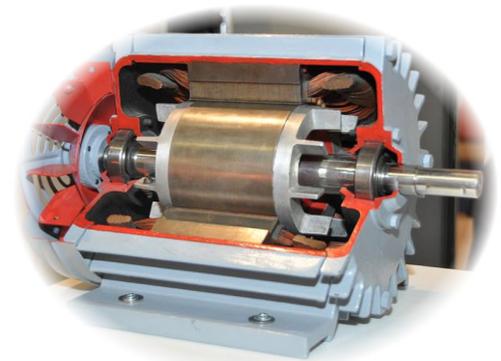
Electricity for Technicians

Expected Time to Complete: 40 hours

Learning Outcomes

On successful completion of this learning module, you will be able to:

1. **DESCRIBE** the basic principles of electromagnetism and magnetic induction.
2. **PERFORM** calculations for simple electric circuits. For example, calculation of current in an electric circuit that has following parameters:
 - a. The circuit is provided with two opposing batteries of voltage ratings 20 volts and 5 volts.
 - b. The circuit consists of two resistors connected in parallel, one rated at 20 ohms and the other at 15 ohms.
3. **DIFFERENTIATE** between AC and DC. You will also be able to describe the following terms: Wavelength, period, amplitude, root mean square value and amplitude.
4. **DESCRIBE** how AC is generated. You will also be able to **DESCRIBE**



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Fleming’s Right Hand Rule and the Left Hand Rule.

5. **DIFFERENTIATE** between the following types of faults: phase to phase, phase to neutral, and a 3-phase fault.

6. **DESCRIBE** the function of the terms related to a power distribution system: Transmission line, power transformer, power circuit breaker, high voltage fuses and high voltage capacitors. You will also be able to **DIFFERENTIATE** between a wound rotor induction motor and a squirrel cage induction motor.

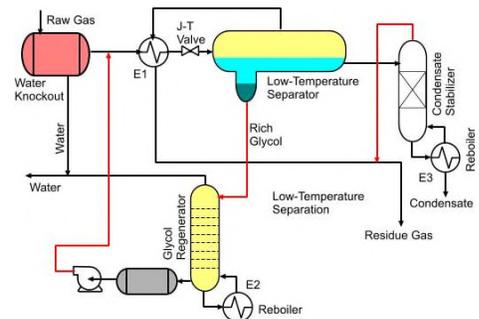
Reading Technical Drawings

Standard Time to Complete: 20 hours

Learning Outcomes

On successful completion of this learning module, you will be able to:

1. **READ** and **IDENTIFY** symbols for pressure instruments such as pressure transmitters, pressure sensors, pressure control valves and pressure control loops.
2. **READ** and **IDENTIFY** symbols for temperature instruments such as temperature transmitters, temperature sensors, temperature control valves and temperature control loops.
3. **READ** and **IDENTIFY** symbols for flow instruments such as flow transmitters, flow sensors, flow control valves and flow control loops.
4. **READ** and **UNDERSTAND** Process Flow Diagrams (PFDs).
5. **READ** and **UNDERSTAND** Process Block Diagrams.
6. **READ** and **UNDERSTAND** Piping and Instrument Diagrams (P&IDs).



ElectricianTechnology1100: Safety - Basic Electrical Energy Concepts – Tools

Standard Time to Complete: 30 hours

Learning Outcomes:

On successful completion of this learning module, you will be able to:

1. **DESCRIBE** effects of electric shock on human body. You will also be able to **DESCRIBE** the PPE suitable for electrical work. You will also be able to **DESCRIBE** common sources that create electric hazards.



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2. **DESCRIBE** the basic nature of safe work practices including Lockout/Tagout. You will also be able to **DESCRIBE** the safety hazards associated with improper use of ladders.

3. **DESCRIBE** what is meant by the terms current, voltage, resistance, power and kWh. You will also be able to **DESCRIBE** multiple uses of the basic electric formula – $E = I \times R$

4. **DESCRIBE** what is meant by Series and Parallel circuits. You will also be able to **DESCRIBE** how to work with circuits that are a mixture of series and parallel configurations.

5. In reference to transformers, you will be able to **DESCRIBE** the following terms: primary winding, secondary winding and step-down transformer.

6. **DESCRIBE** the common tools used for the following purposes: Cutting, stripping, gripping, wire pulling, bending and soldering.



ElectricianTechnology1200 – Installation – Wiring Systems and Conductors

Standard Time to Complete: 30 hours

Learning Outcomes:

On successful completion of this learning module, you will be able to:

1. **DESCRIBE** role of The National Electric Code (NEC) and Occupational Safety and Health Administration (OSHA). You will also be able to **DESCRIBE** what is meant by the terms: Wiring, wiring system, cable and armored cable.
2. **DESCRIBE** the key components that make up armored cable (AC). **DESCRIBE** the common process used to strip armored cable. You will also be able to **DESCRIBE** the common components of Nonmetallic Sheathed Cable (NM), and a method to strip it. You will also be able to **DESCRIBE** the terms: Service-Entrance Cable (SE) and Underground Feeder and Branch-Circuit Cable.
3. **DESCRIBE** what is meant by the terms: Raceway, conduit and electrical metal tubing (EMT). You will also be able to **DESCRIBE** common methods used for cutting, reaming, bending conduits.
4. **DESCRIBE** what is meant by the terms: Electrical Nonmetallic Tubing (ENT), Rigid Metal Conduit (RMC), RIGID PVC Conduit, Intermediate Metal Conduit (IMC), and Flexible Metal Conduit (FMC). You will also be able to **DESCRIBE** steps usually taken to make PVC attachments



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watertight.

5. **DESCRIBE** the terms: wire, solid conductor, stranded conductor. You will also be able to **DESCRIBE** conductor metals commonly used in residential wiring. You will also be able **DESCRIBE** the nature and application of THHN and THHW type conductors. You will also be able to **DESCRIBE** the meaning and application of AWG and KCMIL for conductor sizing.

6. **DESCRIBE** what is meant by Ampacity. You will also be able to **DESCRIBE** basic considerations applied in conductor size selection, including application of adjustment factors as necessary. You will also be able to **DESCRIBE** what is meant by the term Conductor Marking. You will also be able to **DESCRIBE** the common convention used for insulation color.

ElectricianTechnology1300 – Installation – Boxes - Fittings - Device Wiring

Standard Time to Complete: 30 hours

Learning Outcomes:

On successful completion of this learning module, you will be able to:

1. **DESCRIBE** what is meant by the term “electric boxes” and **DESCRIBE** the common shapes for such boxes. You will also be able to **DESCRIBE** common applications for such boxes. You will also be able to **DESCRIBE** the terms: knockouts and pryouts. You will also be able to **DESCRIBE** what is meant by the terms: Fittings, connectors and clamps.

2. **DESCRIBE** what is meant by the terms: Ground clips and bushings. You will also be able to **DESCRIBE** what is meant by the term “Fill Allotment”, and its application.

3. **DESCRIBE** how conductors are prepared for installation and how they are attached to device terminals. You will also be able to **DESCRIBE** the process for splicing and use of “wire connectors.” You will also be able to **DESCRIBE** how switches and receptacles are wired.

4. **DESCRIBE** the makeup of a receptacle and the meaning of the terms duplex receptacle, non –grounding receptacle and grounding of modern receptacle. You will also be able to **DESCRIBE** general procedures for attaching current-carrying conductor to a receptacle.

5. **DESCRIBE** how split-wired receptacles are wired. You will also be



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able to **DESCRIBE** what is meant by the term “fixture” and the considerations that must be taken into account for mounting of fixtures.

6. **DESCRIBE** how the following simple circuits are wired: a pull-chain light fixture, a simple switch-operated light, and method of wiring a light when the conductors must go on to another light.

ElectricianTechnology1400 – Protective Devices

Standard Time to Complete: 30 hours

Learning Outcomes

On successful completion of this learning module, you will be able to:

1. **DESCRIBE** what is meant by the terms: Overcurrent protective device (OCPD), overload, short circuit, ground fault. You will also be able to **DESCRIBE** function of fuses, different types of fuses, plug fuses, cartridge fuses, fuse-Class H, fuse-Class J, fuse-Class R, and fuse-Class T.
2. **DESCRIBE** what is meant by the term “circuit breakers”, application and rating of circuit breakers.
3. **DESCRIBE** what is meant by the term “grounding” and function of grounding. You will also be able to **DESCRIBE** how System Grounding is done.
4. **DESCRIBE** what is meant by the term “bonding” and the proper method for bonding electrical devices.
5. **DESCRIBE** what is meant by the term “Equipment Grounding” and how it functions and how it is wired. You will also be able to **DESCRIBE** what is meant by the terms Ground Fault Circuit Interrupters (GFCI) and Arc-Fault Circuit Interrupters (AFCI)
6. **DESCRIBE** the proper method to ground a service panel and a sub-panel.



ElectricianTechnology1500 – The Service Entrance

Standard Time to Complete: 30 hours

Learning Outcomes

On successful completion of this learning module, you will be able to:

1. **DESCRIBE** a typical overhead service drop as well as an underground one.



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You will also be able to **DESCRIBE** what type of conductors may be used for service entrance.

2. **DESCRIBE** what is meant by the terms: Service drop mast, service entrance insulator, service head, drip loop, and meter socket.
3. **DESCRIBE** how meter socket enclosure is made waterproof. You will also be able to **DESCRIBE** the purpose and configuration of Service Grounding.
4. **DESCRIBE** what is meant by the term Grounding Electrode Conductor.
5. **DESCRIBE** the requirements for service clearances over roofs and above-grade.
6. **DESCRIBE** components of a typical completed Service Entrance.



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Program Accreditation



Houston Industrial Training Institute has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102. In obtaining this approval, HITI has demonstrated that it complies with the ANSI/IACET 1-2007 Standard which is widely recognized as the Standard of good practice internationally. As a result of their Authorized Provider membership status, HITI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET 1-2007 Standard."

Information: Registrar@HoustonIndustrialTraining.com. Please the **Contact Us** button located on our Home Page.



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