GPI Licensing Training: Course Content Outline 2024-25
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Course Description:

An in depth study of propane and natural gas piping from the point of delivery to the gas appliance or utilization equipment. Basic gas theory involving a thorough understanding of the physical properties and characteristics of propane and natural gas will be covered. Piping installations involving gas pipe sizing, material selection, proper installation, and pressure and leak testing of piping is also covered. National Fuel Gas Code as it relates to the above topics is also emphasized. Students will meet/exceed the 60 hour minimum of classroom training required by ***MEC305.02***. Students will also satisfy the theory requirements for ***HVAC134M: Fundamentals of Gas Heating and Piping Installations Theory*** as well as lab hours needed to satisfy ***HVAC135M: Fundamentals of Gas Heating and Piping Installations Lab*** at Manchester Community College. The students will also have the opportunity to attend ***HVAC230M: Gas Equipment Installer and Service Theory*** simultaneously.

Course Objectives:

Upon successful completion of this course, students will be able to:

1. Describe basic gas theory for both natural and propane gas.
2. Demonstrate the ability to design a gas piping distribution system diagram using industry accepted standards.
3. Describe the proper methods of joining all acceptable gas piping materials to industry standards.
4. Demonstrate the correct selection of material and components commonly found in gas piping distribution systems.
5. Demonstrate the ability to size gas pipe distribution systems using various acceptable current industry standards and charts.
6. Describe the theory, purpose and methods of inspection, testing, and purging of gas piping distribution systems.
7. Identify and describe the correct installation procedures of gas piping distribution systems.
8. Demonstrate the application of the current edition of the National Fuel Gas Code as necessary for gas piping system installations.
9. Diagnose faults with gas piping distribution systems.
10. Demonstrate good work habits.

Additional Lab Course Objectives:

Upon successful completion of this course, students will be able to:

1. Demonstrate working safely on gas distribution piping and heating equipment.
2. Thread black steel pipe using hand and power equipment.
3. Demonstrate the ability to install gas distribution piping following all relevant codes for the installation of gas distribution piping.
4. Identify common gas piping distribution system components.
5. Demonstrate the proper use of common gas piping distribution system components.
6. Demonstrate and explain how to perform a pressure test of a gas piping distribution system.
7. Demonstrate and explain how to perform a leak test of a gas piping distribution system.
8. Design a gas piping distribution system plan including all necessary information.
9. Demonstrate and explain how to perform a system start up of a gas piping distribution system using a gas check sheet to ensure compliance.
10. Show the correct use of electric and pressure meters for troubleshooting.
11. Demonstrate and explain the proper use of steady state efficiency test equipment.

Methods of Assessment:

Assessment Method 1: Exams and Quizzes

One or more exams cover classroom instruction material, handouts, and textbook readings. The exams may consist of short problems and essay-type questions. In-class quizzes cover classroom instruction material, handouts, and assigned readings. The quizzes will consist of short problems.

Performance Criteria**:**

Grading is based on a standard 100 point academic scale.

Assessment Method 2: Outside of Class/Homework

Students are assigned specific sections in the code book, manufacturers' literature, or articles to read and answer questions. The questions are designed to help the student select the important parts of the reading, to collect complete information, and to put concepts into their own words. Additional assignments are based on class instruction, so students can measure their ability to apply concepts.

Performance Criteria:

Grading is determined by the clarity and completeness of statements, theoretical explanations, using your own words (no copying from the text), and completing the entire assignment correctly.

Assessment Method 3: Labs

The student will install gas distribution piping following all relevant codes for a heating unit and design a plan including all necessary information. The student will pressure and leak check gas piping.

Performance Criteria:

Grading is determined by drawing a correct piping diagram, how closely the student followed the relevant codes, are components used properly and safely, does the system pass necessary tests, does the actual piping match the diagram, is the gas check sheet accurately filled in.

Assessment Method 4: Observation

The instructor closely observes the student in the lab.

Performance Criteria:

The observation assessment grading is based on the student's overall growth in technical skills, overall growth in technical knowledge, safe work habits, ability to work in a team, attitude, condition of the work site, ability to stay on task, work habits, how much time a student spends in lab, and how much time a student spends working in lab.

Assessment Method 5: Informal

Foster good work habits in students through counseling and class management techniques.

Performance Criteria: Student should come to class on time, prepared, have good attendance, assignments completed on time, develop good social skills, and the ability to stay on task.

Assessment Method 6: Active Class Participation

Students demonstrate the ability to express ideas orally, take an active part in classroom discussion, and share knowledge in a clear, focused, and organized manner. Students also have the opportunity to ask questions related to the discussion. Students will develop critical thinking skills, an understanding of the basics of the Plumbing and HVAC business (including good customer relations, professional ethics, and personnel management), and a commitment to continuing education.

Performance Criteria:

Grades are based on the student's participation in terms of orally demonstrating a clear understanding of the subject matter, answering directed questions, asking questions, being attentive during class, and coming to class prepared and on time.

Outline of Theory Topics Covered:

I. 1. Basic gas Theory for both natural and L.P.
   a. Physical properties and characteristics
      i. Specific gravity
      ii. Heat content
      iii. Safety
   b. Combustion process

II. Current edition of National Fuel Gas Code Handbook
   a. Use of codebook
   b. Chapters as they pertain to specific gas licenses
   c. Definitions
      i. Specific definitions from categories needed for basic gas piping installer license
   d. General requirements

III. Design Material and Components
   a. Piping plans
   b. Permit process
   c. General requirements
   d. Meters
   e. Regulators
   f. Pressure protection devices
   g. Other devices
   h. Piping material and joining methods

IV. Sizing gas pipe systems
      i. Sizing requirements
      ii. Sizing methods
      iii. Use of Tables

V. Proper Installation of gas pipe
      i. Underground piping
      ii. Piping thru foundations
      iii. Piping beneath buildings
      iv. Plastic piping
      v. Piping support
      vi. Prohibited location of gas piping
      vii. Concealed piping in buildings and floors
      viii. Piping in vertical chasses
      ix. Bends in piping
      x. Drip and Sediment Traps
      xi. Outlets
      xii. Branch pipe connections
      xiii. Manual gas shut offs
      xiv. Prohibited devices in piping
      xv. Systems containing gas/air mixtures
      xvi. Bonding and grounding
      xvii. CSST specific Installation requirements

VI. Inspection, Testing, Purging

a. Pressure testing and inspection
b. Piping system leak check
c. Purging
d. Placing appliances and equipment in operation

Outline of Lab Topics Covered:

1. Safety
    A Location and use of all lab safety equipment
        1 fire extinguishers
        2 power off buttons
        3 first aid kit
        4 exits
    C Safety procedures
    D Safe use of power equipment
    E Safe use of ladders
    F Safe use of hand tools
    G Appropriate clothing and shoes
2. Pipe Threading
    a. Hand threader
    b. Power threader
3. Installing gas piping distribution systems
3. Pressure testing gas piping distribution systems
4. Leak testing gas piping distribution systems
5. Draw piping diagrams
6. Combustion testing
7. Troubleshooting

Mec 308.01 Approval of Training Programs for Licensure.

(a) The mechanical licensing board shall approve all educational programs for content, continuity, and applicability toward the licensing of individuals for fuel gas fitting, domestic appliance technicians, hearth system installation and service technicians, and plumbing. The information required for certification to conduct training for the Gas Piping Installer specialty license is included.

(b) If the program requires the use of a classroom, the mechanical licensing board shall review and approve the facility for each applicant's request to determine that the students are attending programs in an environment that shall be as comfortable as possible with regard to temperature, light and seating arrangements. Training will occur in the plumbing and heating shop at the Huot Technical Center, the space is a classroom designed for teaching the trade.

(c) An applicant that wants to have its training program accepted under these rules shall submit to the mechanical licensing board a short statement describing the licensing program or specialty license endorsement program for which the training program is to be evaluated, including: Included on Course Overview

(1) The training program's curriculum; Included on Course Overview

(2) A copy of the training program's educational material; These documents are included in the information provided

(3) A statement demonstrating the method by which the subject matter will be delivered to the student; Included on Course Overview

(4) Copies of quizzes, worksheets, handouts and chapter exams; These documents are included in the information provided

(5) A statement demonstrating:

a. The integrity and proctoring of exams; and The final exam will be proctored by Sharon De La Vergne in the HTC Career Lab in our lower building, more information on this can be found on the included Mec 308.01 Testing document.

b. The educational subject matter incorporated in the tests; and Quizzes and tests will be used to check student knowledge and understanding of the material introduced. These quizzes will be updated as necessary.

(6) A biography of the training program instructors that demonstrates proof of the educational and trade experience required to instruct students on the requested subject matter. This document is included in the information provided

(d) Upon receipt of a request for approval of an applicant's training program, the board shall schedule a time for the applicant to provide a presentation to the board.

Mec 308.02 Testing Organization Approval.

(a) Applicants seeking approval of their testing program shall submit to the mechanical licensing board the following:

(1) A short statement of the specialty license for which the applicant wants its testing program to be evaluated;

We are applying to administer our exam for the Gas Piping Installers specialty license, to students upon successful completion of the GPI course at our technical center.

(2) Copies of the exams that demonstrate the validity of the exam questions as they relate to the adopted codes, standards, and these rules specifically related to licensing endorsement, or trade applied for;

A copy of our exam question bank is included in the submitted information, the bank consists of 135 questions. Students will be given a random mix of 100 questions from the bank, and will need to attain a minimum score of 70% to pass the exam.

(3) The testing administration procedure, as follows:

a. Exams shall consist of a mixture of multiple choice, true or false, fill in the blank, and worksheet calculations;

b. Each exam for licensure shall be no less than 100 questions; and

c. For the purposes of licensing administration, a passing score shall be no less than 70% unless otherwise specified in these rules; and

A copy of our exam question bank is included in the submitted information, the bank consists of 135 questions. Students will be given a random mix of 100 questions from the bank, and will need to attain a minimum score of 70% to pass the exam.

(4) Evidence of the following standards of exam integrity:

a. Tests shall be validated by the testing entity and audited by the board, biannually, to insure reliability to current industry standards, accepted practices and concurrence with applicable codes and standards;

b. Tests shall be maintained in a manner that demonstrates the highest regard for test security, including secured in a locked cabinet when not in use; and

c. The testing entity shall notify the board of its biannual validation of tests pursuant to a. above at which time the board shall conduct an audit of the exam and procedures; and

A copy of the current exam questions bank has been provided with this document.

(5) Evidence of the following standards for the proctoring of exams:

a. Tests shall be administered only to those candidates that have met all of the prerequisites for the specific test being administered;

Only students who complete the GPI course successfully will be eligible to sit for the exam.

b. Test proctors and examiners shall not have been the candidate's instructor for the specialty license they are administering;

The exam will be administered by our Career Coordinator, Sharon De La Vergne, in our Career Lab located in the lower HTC building.

c. Proctors shall monitor the registration process for all examinations;

d. Candidates shall be required to show proof of positive identification by means of government issued photo identification;

Ms. De La Vergne will sign in and register the eligible students, checking their identification and verifying their identity. Sharon is also familiar with the HTC students.

e. Testing environment shall be as comfortable as possible with regard to temperature, light and seating arrangements;

The Career Lab is comfortable and supplies ample space for students to test in.

f. Candidates shall not be permitted to bring any electronic devices into an exam, except that a non-programmable calculator shall be permitted during exams requiring mathematical calculations;

Sharon De La Vergne will confirm the testers do not have any electronics with them, if they do have their cell phones they will be collected until testing is completed. A non-programmable simple calculator will be provided for their use.

g. Candidates shall be adequately spaced so that they cannot readily view the exam documents of other candidates; and

Students will be spaced out adequately to prevent viewing other students' exams, exams will be random so students will have a unique set of questions. The exam will be taken on the Career Center laptops which can be screen monitored by the proctors master station.

h. Alternative proctoring methods, such as oral examination shall be permitted, as approved by the board, provided that adequate justification is submitted. Such

alternative methods shall be as closely similar to the written test method with regard to exam integrity.

If needed students will be eligible to take the exam orally in a separate location.

(b) Upon receipt of a request for approval of an applicant's examination program, the board shall schedule a time for the applicant to provide a presentation to the board.

A biography of the training program instructors that demonstrates proof of the educational and trade experience required to instruct students on the requested subject matter.

My name is Mike Schofield, I am a licensed master plumber (# 4177) in New Hampshire and a licensed gas fitter since the inception of the license (GFE0801590). Working in the field since May of 2000. I am the owner/operator of Scho's Plumbing and Heating LLC and have worked for Bow Plumbing and Heating (2000-2005) and Granite State Plumbing and Heating (2008-2011) as well. I hold an Experienced Educator License (101570) in plumbing with the NH DOE and have been the plumbing, heating and HVAC teacher at the Huot Technical Center in Laconia since 2011, currently in my 14th year as a teacher 2024-25. I have grown the program from almost shutting down from the lack of student interest to now 50+ students in full enrolled classes, with a high percentage of student completers entering the trade. The Gas Piper training to the program will be a fantastic addition for the students entering the field and will provide much needed young folks to the workforce.