

**Course Syllabus**

Course: **Air Sealing, Insulation and Combustion**  
Instructor: **TBD**  
Email: **TBD**  
Time: **TBD**

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**Course Description:** This course is designed to provide individuals who wish to become entry-level retrofit installer technicians with intermediate training in installation of air sealing and insulation in residential buildings. This course will also be useful for incumbent workers who wish to hone air sealing and insulation application skills, as well as semi- or low-skilled individuals who wish to learn to install insulation and air sealing measures in a non-professional setting (e.g. weatherizing their own home). This course utilizes a combination of classroom theory with hands-on exercises and demonstration. In addition to air sealing and insulation methods, practicum and lecture components include use of blower door, basic combustion analysis, indoor air quality in regards to attached garages, and basics of heating and hot water systems.

**Course Objectives:** Upon completion of this class students should be able to:

1. Demonstrate a thorough understanding of the principles of and driving forces behind air leakage
2. Identify high priority air sealing areas and describe rationale for prioritization
3. Identify proper air sealing method(s) for leakage sites
4. Install air sealing measures, from small holes to blocking large openings
5. Demonstrate proper use of Personal Protective Equipment
6. Describe the process of combustion
7. Describe the basic operation of combustion appliances and distribution of heat throughout the home
8. Identify components of combustion appliances and mechanical systems
9. Describe basic combustion safety hazards
10. Assist in identification of combustion appliance safety hazards
11. Demonstrate proper blower door setup
12. Use blower door to identify air leakage sites
13. Use and describe air sealing tools and materials
14. Apply two-part foam
15. Seal and insulate ductwork
16. Describe how insulation prevents heat transfer
17. Describe and demonstrate how to determine R-value of layers of materials
18. Describe uses for various weatherization materials
19. Describe potential indoor air quality issues related to attached garages
20. Install loose fill insulation

21. Handle tools and materials according to manufacturer specifications
22. Demonstrate advanced hand tool use
23. Analyze a work scope and explain how it is used before and on a job site
24. Address deviations from work scope if needed
25. Gather materials and supplies for a weatherization application
26. Set up tools and materials
27. Clean up and organize work area as work is in progress
28. Pick up tools and materials, and clean up and close out a job site

### **Attendance:**

Attendance for the duration of the course is necessary. Extenuating circumstances will be considered by the instructor, but any time missed will compromise the students' ability to obtain the course objectives.

### **Personal Conduct:**

Students are expected to arrive in class promptly and remain until class is dismissed. Smoking and eating in class are prohibited. No gum chewing in class. Cell phones and other devices silenced or turned off. Please respect your fellow classmates as well as the training center staff and facilities.

### **Course Introduction:**

#### **Why take this course?**

This course offers classroom and hands-on training in many of the most important weatherization processes, including using spray foam, air sealing, basic combustion safety and analysis, blower door use, duct sealing and insulation, loose-fill insulation, batt insulation and working in crawlspaces. Most of the time is devoted to hands-on training. Effective weatherization installers should have the ability to perform and understand the theories behind these actions.

The course competencies coincide with the National Renewable Energy Laboratory's Job Task Analysis (JTA) standards for Retrofit Installer Technician. This JTA is used as the accreditation standard for training institutions by the Interstate Renewable Energy Council, the North American administrator for the Institute for Sustainable Power Quality (ISPQ). ISPQ sets international standards for renewable energy and energy efficiency training programs. The JTA can be downloaded for free at <http://www.irecusa.org/irec-programs/credentialing/ispq/key-docs/jtas/>.

#### **Who should take this course?**

This course is designed for individuals with a) a moderate amount of weatherization experience, and/or b) have successfully completed BDL 101 (Introduction to Weatherization and Retrofit & the Weatherization Assistance Program) and BDL 102 (Building Science: The House as a System & Principles of Energy). It is essential training for anyone who wishes to become a weatherization installer.

### **Course Schedule:**

#### **Day 1**

##### **Lecture/Discussion**

- Course introduction
- Air leakage

##### **Break**

**Field Training**

- Using portable spray foam

**Lunch****Field Training**

- Air sealing holes, cracks and large openings

**Break**

- Air sealing holes cracks and large openings

**Day Two****Lecture/Discussion**

- Review Day 1
- Basics of combustion analysis

**Break****Field Training**

- Basics of combustion safety and analysis

**Lunch****Field Training**

- Basics of combustion safety and analysis
- Basics of mechanical ventilation systems

**Break****Field Training**

- Basics of mechanical ventilation systems

**Lecture/Discussion**

- Advanced air leakage diagnostics

**Field Training**

- Blower door diagnostics

**Day Three****Lecture/Discussion/Field Exercise**

- Review Day 2
- Blower Door Diagnostics

**Break****Field Training**

- Air sealing methods

**Lunch****Field Training**

- Duct sealing and insulation

**Break****Lecture/Discussion**

- Quiz: Air leakage and air sealing
- Review quiz

#### **Day Four**

##### **Lecture/Discussion/Activity**

- Review Day 3
- installing insulation

##### **Break**

##### **Field Training**

- Installing loose-fill insulation

##### **Lunch**

##### **Field Training**

- Installing loose-fill insulation

##### **Break**

##### **Field Training**

- Installing batt insulation and working in a dry crawlspace

#### **Day Five**

##### **Lecture/Discussion/Activity**

- Review Day 1
- Quiz: Insulation
- Review quiz

##### **Break**

##### **Lecture/Discussion**

- Attached garages and indoor air quality

##### **Lecture/Discussion/Field Exercise**

- Time overflow
- Makeup labs

##### **Lunch**

- Review

##### **Break**

- Written exam

#### **Assessments:**

This is a pass/fail course, and each student must pass *both* components of the course (lab and classroom) to successfully complete the course. For the classroom component, 75% and above is a passing grade. For the lab component, all labs must be passed (see lab rubrics for pass/fail grades). If a student fails two labs or less, remedial test outs will be offered.

Successful completion will result in an Energy Coordinating Agency Certificate of Achievement.

**Materials:**

- Energy Coordinating Agency. (2012). Air Sealing, Insulating and Combustion. In Energy Coordinating Agency, *Energy conservation training handbook: Academic and technical training for weatherization and retrofit installer* (pp. 181 – 272). Philadelphia, PA.

**Optional:**

- Energy Coordinating Agency. (2012). *Energy conservation training handbook: Academic and technical training for weatherization and retrofit installer*. Philadelphia, PA.
- Harley, B. (2002). *Insulate and weatherize*. Newtown, CT: The Taunton Press.
- Krigger, J., & Dorsi, C. (2009). *Residential energy: Cost savings and comfort for existing buildings*. Helena, MT: Saturn Resource Management, Inc.
- U.S. Department of Energy, Energy Efficiency and Renewable Energy Program website – [www.energysavers.gov](http://www.energysavers.gov).
- Weatherization Assistance Program Technical Assistance Center website – [www.waptac.org](http://www.waptac.org).