



Western Technical College

# 10481109 Introduction to Building Envelope Analysis

## Course Outcome Summary

### Course Information

<b>Description</b>	Students will learn the tools and techniques used in the analysis of building envelope. To meet air tightness goals, students will apply test in and test out methodology. Completion of this course prepares the student for BPI Building Analyst certification.
<b>Career Cluster</b>	Architecture and Construction
<b>Instructional Level</b>	Associate Degree Courses
<b>Total Credits</b>	3
<b>Total Hours</b>	54

### Textbooks

*Saturn Energy Auditor Field Guide*. Copyright 2010. Krigger, John and Chris Dorsi. Publisher: Saturn Resource Management. **ISBN-13:** 978-1-880120-17-0. Required.

### Success Abilities

1. Cultivate Passion: Enhance Personal Connections
2. Cultivate Passion: Expand a Growth-Mindset
3. Cultivate Passion: Increase Self-Awareness
4. Live Responsibly: Develop Resilience
5. Live Responsibly: Embrace Sustainability
6. Live Responsibly: Foster Accountability
7. Refine Professionalism: Act Ethically
8. Refine Professionalism: Improve Critical Thinking
9. Refine Professionalism: Participate Collaboratively
10. Refine Professionalism: Practice Effective Communication

## Course Competencies

### 1. Analyze the building envelope.

#### Assessment Strategies

- 1.1. Demonstration
- 1.2. Report

#### Criteria

*You will know you are successful when*

- 1.1. you perform a blower door test.
- 1.2. you determine air leakage locations.
- 1.3. you perform visual inspections.
- 1.4. you use smoke for analysis.
- 1.5. you document findings in a report.

#### Learning Objectives

- 1.a. Differentiate conditioned and unconditioned space.
- 1.b. Identify vapor management layers.
- 1.c. Identify air management layers.
- 1.d. Identify thermal management layers.
- 1.e. Classify building types.
- 1.f. Examine location of pressure boundary and thermal boundary.

### 2. Interpret thermal images.

#### Assessment Strategies

- 2.1. Demonstration
- 2.2. Report

#### Criteria

*You will know you are successful when*

- 2.1. you identify temperature differences in thermal images.
- 2.2. you locate air infiltration in thermal images.
- 2.3. you locate water presence in thermal images.
- 2.4. you locate insulation in thermal images.
- 2.5. you locate presence of utilities in thermal images.
- 2.6. you locate framing members in thermal images.

#### Learning Objectives

- 2.a. Assess thermal boundary of buildings.
- 2.b. Assess pressure boundary of buildings.
- 2.c. Evaluate envelope integrity.
- 2.d. Identify mechanical systems in envelope assemblies.
- 2.e. Detect moisture in envelope assemblies.

### 3. Analyze duct systems.

#### Assessment Strategies

- 3.1. Demonstration
- 3.2. Report

#### Criteria

*You will know you are successful when*

- 3.1. you set up the duct blower system for depressurization testing.
- 3.2. you properly set up the manometer.
- 3.3. you prepare the duct system for testing.
- 3.4. you describe the duct testing process.

#### Learning Objectives

- 3.a. Examine duct systems in homes.
- 3.b. Demonstrate proper duct tightness testing procedures.

- 3.c. Attain accurate duct testing results.
- 3.d. Determine air flow of exhaust fans.

#### **4. Analyze combustion appliances.**

##### **Assessment Strategies**

- 4.1. Demonstration
- 4.2. Report

##### **Criteria**

*You will know you are successful when*

- 4.1. you follow BPI combustion safety analysis protocols.
- 4.2. you properly operate the combustion analyzer.
- 4.3. you monitor ambient air for carbon monoxide.
- 4.4. You properly operate the manometer to establish base lines, worst case depressurization
- 4.5. You generate accurate results for combustion analysis.

##### **Learning Objectives**

- 4.a. Monitor combustion gases.
- 4.b. Detect combustion fuel leaks.
- 4.c. Determine risks to health and safety due to combustion appliances.

#### **5. Recommend energy saving interventions.**

##### **Assessment Strategies**

- 5.1. Demonstration
- 5.2. Report

##### **Criteria**

*You will know you are successful when*

- 5.1. you generate a report with energy saving recommendations.
- 5.2. you perform cost effective analysis of energy saving recommendations.
- 5.3. you present your report to the client or customer.

##### **Learning Objectives**

- 5.a. Analyze energy loads.
- 5.b. Determine appropriate energy saving interventions.
- 5.c. Assess cost effectiveness of energy saving interventions.

#### **6. Communicate professionally with clients and customers.**

##### **Assessment Strategies**

- 6.1. Demonstration

##### **Criteria**

*You will know you are successful when*

- 6.1. you discuss customer/client comfort complaints.
- 6.2. you discuss combustion hazards.
- 6.3. you discuss moisture issues.
- 6.4. you discuss the existing condition of the building and potential retrofits.
- 6.5. you discuss insulation issues.

##### **Learning Objectives**

- 6.a. Determine client/customer needs.
- 6.b. Explain building envelope analysis process.
- 6.c. Demonstrate professional behavior.