



Western Technical College

10481107 High Performance Buildings

Course Outcome Summary

Course Information

Description	Students will study topics related to high performance buildings, including: air tightness testing and verification, ventilation strategies, envelope assemblies, durability, moisture management, control layers, energy optimization, and high performance windows and doors. Students will also examine high performance building standards and programs such as LEED for Homes, GreenStar and Passive House.
Career Cluster	Architecture and Construction
Instructional Level	Associate Degree Courses
Total Credits	3
Total Hours	72

Pre/Corequisites

Prerequisite 10481109 Introduction to Building Envelope Analysis

Textbooks

Toward a Zero Energy Home: A Complete Guide to Energy Self-Sufficiency at Home. Copyright 2010. Johnston, David and Scott Gibson. Publisher: Ingram Publisher Services. **ISBN-13:** 978-1-60085-143-8. 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

Experiential Learning

1. Work-Based Learning: this course applies your learning to your desired profession by working in industry placements such as internships, practicums, clinicals, or co-ops.

Course Competencies

1. Explain high performance building standards.

Assessment Strategies

- 1.1. Case Study
- 1.2. Project

Criteria

You will know you are successful when

- 1.1. you describe a LEED certified project.
- 1.2. you describe a Passive House Certified project.
- 1.3. you describe a Zero Energy Ready Home certified project.
- 1.4. you describe a code built structure.
- 1.5. you compare the energy performance of certified projects.

Learning Objectives

- 1.a. Compare high performance building standards.
- 1.b. Examine high performance building standards.
- 1.c. Examine building codes.

2. Explore the building process.

Assessment Strategies

- 2.1. Presentation
- 2.2. Project

Criteria

You will know you are successful when:

- 2.1. you identify the scheduling associated with a building project.
- 2.2. you document with digital images the steps in the building process.
- 2.3. you identify the costs of various parts of the building process.
- 2.4. you identify the stages of construction from visual images.

Learning Objectives

- 2.a. Explore integrated planning methodology.
- 2.b. Sequence the steps of building process.
- 2.c. Summarize safe practices as it relates to the building process.

3. Participate in integrated team learning.

Assessment Strategies

- 3.1. Project

Criteria

You will know you are successful when:

- 3.1. you attend three integrated team planning meetings.
- 3.2. you prepare for three integrated team planning meetings.

- 3.3. you complete action items associated with integrated team planning meetings.
- 3.4. you dress business casual or better for your integrated team planning meetings.
- 3.5. you take relevant notes documenting the proceedings of team integrated planning meetings.

Learning Objectives

- 3.a. Be willing to work respectfully with a diverse team.
- 3.b. Participate actively in team meetings.
- 3.c. Understand the value of working within a team.
- 3.d. Practice effective communication (oral and written) on your team.

4. Analyze energy as it relates to buildings.

Assessment Strategies

- 4.1. Case Study
- 4.2. Project

Criteria

You will know you are successful when

- 4.1. you document total energy consumption of a building.
- 4.2. you document source energy for a building.
- 4.3. you assess the environmental impacts of source energy for a building.
- 4.4. you separate energy loads for a building.

Learning Objectives

- 4.a. Identify energy sources as they relate to buildings.
- 4.b. Examine energy consumption of buildings.
- 4.c. Document costs associated with energy consumption associated with buildings.

5. Recommend sustainable building practices.

Assessment Strategies

- 5.1. Report
- 5.2. Project

Criteria

You will know you are successful when:

- 5.1. you identify energy savings opportunities.
- 5.2. you calculate the return on investment on energy conservation measures.
- 5.3. you explain sustainable building methods.
- 5.4. you identify sustainable building materials.
- 5.5. you identify the durability of building materials.

Learning Objectives

- 5.a. Evaluate sustainability as it relates to building practices.
- 5.b. Evaluate sustainability as it relates to building materials.
- 5.c. Compare high performance building projects.

6. Evaluate building durability.

Assessment Strategies

- 6.1. Case Study
- 6.2. Project

Criteria

You will know you are successful when:

- 6.1. you calculate dew points in building assemblies.
- 6.2. you model building assemblies using hygrothermal analysis software.
- 6.3. you determine the temperature of condensing surfaces in building assemblies.
- 6.4. you test air tightness of building assemblies using blower door equipment.
- 6.5. you visually inspect HVAC systems.

Learning Objectives

- 6.a. Evaluate moisture interactions associated with building systems.
- 6.b. Evaluate energy interactions associated with building systems.
- 6.c. Demonstrate a blower door test.

7. Examine renewable energy systems.

Assessment Strategies

- 7.1. Case Study
- 7.2. Project

Criteria

You will know you are successful when:

- 7.1. you perform a renewable energy site assessment.
- 7.2. you establish renewable energy production targets.
- 7.3. you size a system to meet energy production targets.
- 7.4. you calculate actual production of a renewable energy system.
- 7.5. you calculate the costs associated with installing a renewable energy system.
- 7.6. you calculate return on investment for a renewable energy system.

Learning Objectives

- 7.a. Calculate energy produced by renewable energy systems.
- 7.b. Determine efficiency of renewable energy systems.
- 7.c. Identify appropriate siting for renewable energy systems.

8. Examine heating, cooling and ventilation systems.

Assessment Strategies

- 8.1. Case Study
- 8.2. Project

Criteria

You will know you are successful when:

- 8.1. you identify heating equipment.
- 8.2. you identify cooling equipment.
- 8.3. you identify ventilation equipment.
- 8.4. you determine size of HVAC equipment.
- 8.5. you identify maintenance issues with HVAC equipment.
- 8.6. you optimize the performance of HVAC equipment.

Learning Objectives

- 8.a. Document heating equipment associated with buildings.
- 8.b. Document cooling equipment associated with buildings.
- 8.c. Document ventilation equipment associated with buildings.