

Technological Innovation: Building "Green" Into the Budget

Course # BLTI205



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Course Description

This three hour ***online video course*** will bring attention to methods of green building that allow homes to have less impact on the environment, while providing a greater economic benefit to the homeowner. As technological innovation creates new construction possibilities, incorporating energy-efficiency into building projects can not only provide a better quality of life, but also protect the environment. However, energy efficient building requirements can be stringent and cost prohibitive. It is a challenge to provide customers with the latest energy efficient systems--all within a budget that homeowners are willing to provide. This course will help industry professionals identify important considerations and then apply those principles to a specific project.

After completing this course participants will be able to:

- Accurately define energy conservation and generation concepts, and describe at least three efficient use of materials that will save building and operation costs.

- Identify the techniques used in alternative wall systems, and explore the benefits of each.
 - Demonstrate many uses of both EPS and XPS insulation sheathing.
 - Outline at least one application of energy efficient design in indoor systems.
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COURSE OUTLINE

Chapter 1. Heat Transfer and Thermal Imaging (30 Minutes)

****Learning Objectives:*** 1) Recognize the impact of energy consumption. 2) Understand energy conservation and generation concepts. 3) Identify types of heat transfer. 4) Describe the uses of thermal imaging cameras and blower door equipment.

I. Energy Consumption

- A. Energy
- B. Resources
- C. Building Systems

II. Energy Conservation

- A. Reduced consumption, emissions
- B. Energy Efficiency Standards and Methods

III. Diagnostic Testing

- A. Thermal Imaging
- B. Blower Door Testing

Chapter 2. Advanced Framing Techniques (30 Minutes)

****Learning Objectives:*** 1) What is advanced framing, and what are some of the techniques used? 2) List the uses of insulated headers

and energy heel trusses. 3) Understand the benefits of pre-fabricated walls.

I. Advanced Framing Techniques

- A. 2 x 6 studs
- B. Headers
- C. Raised Heel Trusses

II. Raised Heel Trusses

- A. Full height insulation
- B. Cost efficient

III. Double 2 x 4 Walls

- A. Thicker insulation
- B. Drawbacks

IV. Prefabricated Walls

- A. Reduced waste
- B. Higher quality

Chapter 3. Air Barriers (30 Minutes)

***Learning Objectives:** 1) Apply the benefits of energy efficient building. 2) Describe the purpose of air barriers and what materials are typically used. 3) List the uses of SIPs and ICFs.

I. Design and Implementation of Energy Efficient Design

- A. Design phase
- B. Subs and employees
- C. Training

II. Air Sealing

- A. Finding leaks
- B. Materials

III. Airtight Drywall

- A. Methods
- B. Drawbacks

IV. Prefabricated Walls

- A. Reduced waste
- B. Higher quality
- C. SIPs
- D. ICFs

Chapter 4. Insulation (25 Minutes)

****Learning Objectives:*** 1) Recognize the pros and cons of fiberglass and cellulose insulation material. 2) Describe the proper installation of fiberglass insulation. 3) Apply proper installation of cellulose insulation.

I. Fiberglass Batts

- A. Uses
- B. Various configurations: high density, standard density
- C. Installation

II. Cellulose Insulation

- A. Uses
- B. Various configurations: dense packed, dry spray

III. Roof Installation

- A. Methods
- B. Baffles

Chapter 5. Foam Insulation/Sheathing (30 Minutes)

***Learning Objectives:** 1) Identify different types of foam insulation available. 2) Understand the pros and cons of polyisocyanurate and polyurethane spray foam. 3) Demonstrate the many uses of both EPS and XPS insulating sheathing.

I. Spray Foam

- A. Urea Formaldehyde
- B. Cementitious
- C. Phenolic
- D. Polyisocyanurate or polyiso
- E. Polyurethane

II. Various configurations

- A. Open cell, Closed cell

III. Insulating Sheathing

- A. Uses
- B. Examples: expanded, extruded

Chapter 6. U-Factor/R-Value (25 Minutes)

***Learning Objectives:** 1) Recognize the uses of and effectiveness of radiant barriers. 2) Identify and define what the National Fenestration Rating Council does. 3) Formulate U-Factor and R-Value conversions. 4) Explore different methods to increase U-Factor.

I. Radiant Barrier Sheathing

- A. Benefits
- B. Heat Transfer
- C. Types

II. Window selection

- A. NFRC
- B. SHGC
- C. Low E coatings
- D. Inert gas
- E. Visible Transmittance
- F. Air Infiltration Rate

III. U-Factor/R-Value

- A. Definitions/Conversions

Chapter 7. Lighting/Duct Design (25 Minutes)

****Learning Objectives:*** 1) What are the positives and negatives of incandescent or compact fluorescent lighting? 2) Understand the amount of energy wasted by poor duct design 3) Determine proper duct design and installation.

I. Incandescent Lighting

- A. Benefits/Flaws

II. Compact Fluorescent Lighting

- A. Benefits/Flaws

III. Light Emitting Diodes

- A. Benefits/Flaws

IV. Duct Design

- A. Best Practices
- B. Duct Sealing
- C. Installation
- D. Common Problems

Chapter 8. Green Appliances (35 Minutes)

***Learning Objectives:** 1) Understand how to read energy guide labels. 2) Define heat/energy recovery ventilation. 3) Identify sealed combustion appliances. 4) List different types of water heaters. 5) Define and be able to understand what a SEER rating is.

I. Energy Guide Labels

A. What does it all mean?

II. Energy Recovery Ventilation

A. Benefits/Costs

III. Sealed Combustion Heating Appliances

A. Description

B. Benefits

IV. Water Heaters

A. Standard tank

B. Condensing

C. Tankless

D. Common Problems

V. Seasonal Energy Efficiency Ratio (SEER)

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