POINTFUL EDUCATION

Construction Fundamentals & Careers Syllabus

» Course Overview

This course introduces students to some of the foundational elements of home construction and then does a deep dive into careers, technology, and the future of home construction. It also addresses some of the academic proficiencies that different careers in the field of home construction will have to have. Later in the course, specific careers, career outlooks, and specialized education and training requirements will be covered. Students will discover the varied roles within the field as well as what it takes to own a construction company. Finally, the course delves into green construction and where the future of construction is headed.

» Course Outline by Module

Module 1	Introduction to Home Construction	**Module 6**	Contracts and Regulations in Home Construction
Module 2	Academic Foundations for Careers in Construction	**Module 7**	Careers in Home Construction
Module 3	Technical Skills in Home Construction	**Module 8**	Owning a Construction Business
Module 4	Project Planning in Home Construction	**Module 9**	Green Construction
Module 5	Safety and Health in Home Construction	**Module 10**	The Future of Home Construction

» Module Overview and Learning Objectives

Module 1. Introduction to Home Construction

Homebuilding has a long history in the United States. Owning a home has long been considered part of reaching the American Dream. In this module, you'll learn about where the home construction industry began and where it is now, as well as where it's headed.

You may not own a home just yet, but you'll learn about some of the costs of owning and taking care of a home. The construction industry has a lot of moving parts! We'll begin to explore things that companies have to consider to stay ahead of the pack.

***Learning Objectives*:** In this module, students will:

- Examine the timeline of how construction started and has evolved in the United States
- Describe how the economy impacts the home construction industry
- Discuss the growth of the home construction industry as it relates to economic trends and population growth in the United States
- Identify the costs associated with building and maintaining a home
- Examine the impact that technology has and will have on the home construction industry

Module 2. Academic Foundations for Careers in Construction

Math and home construction go hand-in-hand. Think about what a house would look like if the angles were wrong or if it wasn't standing on a balanced foundation. What if doors and windows weren't installed correctly? So many things could go wrong if a house is built or renovated without accuracy. That accuracy is thanks to math. The specific formulas used in measuring, calculating angles, making correct conversions, and breaking up a whole into its parts can mean the difference between a solidly built structure and a house that is standing on shaky ground (and probably not for too long!)..

***Learning Objectives*:** In this module, students will:

- Evaluate the necessity of basic mathematics in home construction and use basic math functions to complete job site/workplace tasks
- Use geometric formulas to determine areas and volumes of various structures
- Use appropriate formulas to determine percentages /decimals
- Use appropriate formulas to determine ratios, fractions, and proportion measures.
- Use appropriate formulas to determine measurements of dimensions, spaces, and structures.

Module 3. Technical Skills in Home Construction

In this module you'll learn about construction drawings, or blueprints. You'll examine the various techniques for reading drawings, including familiarizing yourself with common symbols and abbreviations. You will also learn about the various types of drawings that you may come across when you work in the industry. You'll understand the various views of blueprints as well as manufacturing drawings and prints. In addition, you'll be learning about safety standards established by the Occupational Safety and Health Administration (OSHA). You'll also learn about standards established for the testing and use of various materials by ASTM International. Further, this module will address determining what tools, machinery, and equipment your business will use and how you'll procure these items. Finally, we'll review some industry publications and recognize why it is crucial to stay connected to the information these publications provide.

***Learning Objectives*:** In this module, students will:

- Recognize elements and symbols of blueprints and drawings
- Interpret and explain standards and specifications
- Use architect's plan, manufacturer's illustrations, and other materials to communicate specific data adn visualize proposed work
- Select tools, machinery, equipment, and resources that match requirements of the job
- Read current periodicals, industry publications, and manufacturer's catalogs

Module 4. Project Planning in Home Construction

In this module, we'll take a deep dive into project planning in home construction. You'll develop further understanding of the construction and project management processes and how these processes are integrated into the entirety of the project. We'll discover important planning steps to consider to avoid problems with estimates, confusion over construction drawings or revisions, and job site problems. You'll identify industry best practices when it comes to crafting the best plans and coming up with creative solutions to common and not-so-common complications that may occur.

***Learning Objectives*:** In this module, students will:

- Plan, organize, schedule, and manage a project/job to optimize workflow and outcome
- Estimate resources/materials required for a specific project or problem
- Use available resources/materials effectively while completing a project or resolving a problem with a project plan
- Determine alternative solutions for a specific project/problem
- Generate a project update that tracks changes necessitated by unexpected events and conditions

Module 5. Safety and Health in Home Construction

Safety is the most important consideration in every industry, but perhaps even more so in construction since there are so many things that can go wrong on a job site, from incomplete (or no) training on equipment use to various slip, trip, and fall hazards. There are regulations set forth by the government, specifically OSHA. Companies are required to comply with these regulations. Many go steps further and develop internal safety plans and controls. As a construction manager or a worker, you have a responsibility to keep yourself, your environment, and your co-workers as safe as possible. In this module we'll focus on some of the conditions on job sites that are responsible for the most accidents, injuries, and fatalities. We'll also discuss steps you and your company can take to ensure the safety of everyone on every job!

***Learning Objectives*:** In this module, students will:

- Demonstrate methods to correct common design and construction hazards
- Identify types and sources of workplace hazards common to design and construction situations
- Demonstrate principles of safe physical movement to avoid slips, trips, and spills
- Inspect and use personal protective equipment (PPE)
- Locate and identify specific organizational policy, rule, or procedure to assist with a given situation

Module 6. Contracts and Regulations in Home Construction

Contractors have a lot to manage. In addition to the overall management of a building project, there are contracts with owners, contracts with subcontractors, training and managing employees, and, of course, safety. With the weight of all of these things placed squarely on the shoulders of a general contractor, it's essential that she or he knows the best practices within the industry to keep the construction company safeguarded against lawsuits or being swindled by a disreputable subcontractor. This module provides guidelines for contracts, advantages and disadvantages of using subcontractors, and how to best communicate with employees for the utmost effectiveness and efficiency.

***Learning Objectives*:** In this module, students will:

- Understand contractual relationships with all parties involved in the building process to ensure successful build of a project.
- Design and implement submittal approval procedures to ensure effective flow of information in construction process.
- Understand construction subcontracts and manage working relationships on a project.
- Locate appropriate information on organizational policies in handbooks and manuals.
- Discuss how specific organizational policies and rules influence a specific work situation.

Module 7. Careers in Home Construction

In this module, we'll explore careers in home construction more in depth. Included here is information about the expected growth rate, training needed, certifications and licenses required, and the earning capacity for specific jobs. We'll also cover OSHA requirements and why safety must be the primary concern in every construction situation regardless of specific job duties. You'll begin to hone in on the demands and qualifications for certain jobs and perhaps find direction for the career path you want to pursue

***Learning Objectives*:** In this module, students will:

- Identify the various roles in the construction of a home
- Discuss the physical responsibilities within each role in the construction of a home
- Explore the safety regulations associated with each role in the construction of a home
- Identify the certifications or legal requirements necessary for each role in the construction of a home
- Evaluate the compensation and expectations for each role in the construction of a home

Module 8. Owning a Construction Business

Owning a business can be a big undertaking. There are people to hire, customers to get, and an entire infrastructure to build based on your vision. But the process can be simplified by understanding the steps necessary for success. Creating a business plan is one of the best ways to identify the things that are important to you and to your business. In your business plan, you can establish your goals, processes, and timelines. Since construction companies can be costly to start given all the equipment and tools necessary to complete projects, you can pinpoint ways to finance your venture and earn revenue. When you build your team of employees and independent contractors, you can be sure that you are hiring those who share your vision and can help to create the culture you want for your organization.

***Learning Objectives*:** In this module, students will:

- Describe the steps necessary to start a construction business
- Evaluate the pros and cons to opening a Sole Proprietorship, S-Corporation, or C-Corporation
- Identify the roles necessary within the office of a construction company
- Analyze the cost difference between having full-time employees as opposed to contractors
- Describe strategies used to promote collaboration, trust, and clear communication among contractors, suppliers, clients, and others on a job site

Module 9. Green Construction

Green homes are the future and, in some ways, the past. Builders are looking both backwards and forwards in approaches to green, environmentally-friendly building practices, materials, and assemblies. They're looking back at materials that have been used for centuries and finding new ways to make these materials more durable and efficient for today's homeowners. They're also looking ahead at how improved methods can add energy back to our environment and stop the depletion of the planet's natural resources.

***Learning Objectives*:** In this module, students will:

- Define green construction and discuss its benefit to the environment
- Describe the differing components between a home construction and a green home construction project
- Evaluate green materials which may be used in place of traditional construction materials
- Compare and contrast the benefits of green roofs and solar roofs
- Analyze the cost benefit over time to homeowners in building a green home

Module 10. The Future of Home Construction

The home construction industry has been quicker than most business sectors to adopt new technology. There aren't many construction sites that don't rely on smart technology like phones and tablets to communicate and get up-to-the-minute changes and work orders. Construction companies are using drones, 3D printers, and robots. Just a few decades ago, these changes would have seemed absurd to even think about. Who would have ever thought you could use a printer to literally construct a house? These changes are as exciting to homeowners (and our planet, which is reaping the benefits) as they are to anyone entering the exciting field of home construction.

***Learning Objectives*:** In this module, students will:

- Identify new and emerging technologies in green construction
- Discuss the potential impact of robotics to construction and green construction
- Evaluate the potential impact of artificial intelligence advances to construction and green construction
- Discuss the future of home construction as it relates to population growth
- Compare and contrast Smart home construction and green home construction