

Construction Technology (Canada)



20 to 24 hours to complete.

14 quizzes plus practice exercises
Final test 100 questions
Passing mark on final test = 70%

COURSE DESCRIPTION

Explore building science and its importance to constructing effective building envelopes and building durable homes. Construction Technology is made up of 14 modules that cover the following topics:

1. Introduction to Construction Technology
2. Building Components
3. Moisture Management
4. House as a System
5. Indoor Air Quality
6. Healthy Housing
7. Fundamentals of Air Sealing
8. Strategies for Air Sealing
9. Fundamentals of Insulation
10. Strategies for Insulation
11. Fundamentals of Windows and Doors
12. Fundamentals of Energy
13. Mechanical Systems Overview
14. Ventilation Requirements

Each module includes a downloadable study guide to accompany the online learning program. There is a review and quiz at the end of each module to help you gauge your understanding of the topics covered.

Objectives

After completing this course, you will be able to:

- Apply the House as a System Concept
- Interpret the role of sustainable development in construction
- Understand how building science affects building durability and occupant comfort
- Categorize the signs, symptoms and solutions for good indoor air quality
- Describe building envelope details
- Identify how the control or contribute to heat, air, and moisture flows
- Distinguish between mechanical systems

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COURSE OUTLINE

Module 1: What is Construction Technology?

Construction Technology

Introduction

Building Science

House As A System

Sustainability

Energy Efficiency
Resource Efficiency
Environmental Responsibility

Module 2: Building Components & Systems

Foundations

Basement Types
Crawlspace
Slab On Grade

Walls & Floors

Framed Walls
Masonry Walls
Floor Systems
Panelized Systems
Roof System Types

Module 3: Moisture Management

Keeping Moisture Off, Out, and Away

Foundations
Walls
Roofs

Module 4: House As A System

Heat Flow

Convection
Conduction
Radiation

Air Flow

Wind Effect
Stack Effect
Combustion/
Ventilation Effect
Neutral Pressure Plane

Moisture Flow

Humidity
Liquid Water
Water Vapour

Module 5: Indoor Air Quality

Sources

Airborne
Moisture-Related

Symptoms

Occupant
House Structure

Solutions

Eliminate
Filtrate
Ventilate

Module 6: Healthy Housing

Materials

Construction Assembly
Finishes

Combustion Spillage

Signs
Risks
Remediation

Radon

Identifying
Testing
Controlling

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COURSE OUTLINE

Module 7: Fundamentals of Air Sealing

Purpose of Air Sealing

Types of Barriers

- Weather Barriers
- Air Barriers
- Vapour Barriers

Approaches

- Interior Air Barriers
- Exterior Air Barriers

Air Sealing Materials

Module 8: Strategies for Air Sealing

Air Sealing Issues

- Thermal Bypasses
- Solar Vapour Drive
- Ice Damming

- Foundations
- Walls & Floors
- Ceilings & Roofs

Module 9: Fundamentals of Insulation

Properties of Insulation

- Dew Point
- Wind Washing

R-value

- Nominal R-Value
- Effective R-value

Insulation Materials

- Fibrous Types
- Foam Types

Module 10: Strategies for Insulating

Below Grade

- Slabs
- Walls

Above Grade

- Rim Joists
- Walls
- Exposed Floors

Ceilings

- Flat Ceilings
- Sloped Ceilings

Module 11: Fundamentals of Windows & Doors

Window & Door Anatomy

Comfort Factors

- Radiation
- Solar Gain
- Convection
- Wind Washing
- Conduction

Window Performance

- Solar Heat Gain Coefficient
- Visible Transmittance
- U-Values
- Glazing
- Emissivity
- Gas fills
- Insulating Spacers
- Frames

Doors

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COURSE OUTLINE

Module 12: Fundamentals of Energy

Occupant Comfort

- Degree Days
- Mechanical Systems
- F-280 Standard

Fuel & Energy Sources

- Energy Terms
- Combustion Fuels
- Electricity

Heat Loss/Heat Gain

- F-280 Requirements
- Winter Design Conditions
- Heat Loss Calculation
- Sensible & Latent Heat Gain
- Summer Design Conditions

Module 13: Mechanical Systems Overview

Space Heating

- Furnaces
- Boilers
- Electric Resistance
- Heat Pumps
- Integrated Mechanical Systems
- Efficiency & Performance

Space Cooling

- Types of Air Conditioners
- Efficiency and Performance

Delivery Systems

- Forced Air
- Hydronic
- Controls

Module 14: Ventilation Requirements

Why Ventilate?

- Controlling Air Flow
- Air Filtration
- Occupant Impacts

F-326 Standard

- Room Count
- Ventilation Capacity
- Depressurization

Systems

- Exhaust Only
- Supply Only
- Balanced Whole House

Construction Math 1 & 2



TOTAL for Construction Math 1 & 2:

18 to 24 hours to complete.

Construction Math 1:

2 quizzes plus practice exercises

Final test 50 questions

Passing mark on final test = 70

Construction Math 2:

2 quizzes plus practice exercises

Final test 50 questions

Passing mark on final test = 70

COURSE DESCRIPTION

Math is the language of construction. It's important for accuracy, efficiency, and safety to make sure the work is done correctly. The aim of this course is to help the learner develop an understanding of how arithmetic, algebra, geometry, and conversions relate to construction.

To make it easier to succeed in this course, we've split Construction Math into 2 parts, with a test at the end of each.

At the end of Construction Math 1 & 2, you will be able to:

- Use and understand all operations on whole numbers, fractions and decimals commonly used in the construction industry
- Calculate the perimeter, circumference, area, and volume of various shapes and figures including floor and roof areas, concrete footings, slabs, walls, and columns
- Convert measurements from fractions to decimals
- Convert measurements between metric and imperial systems

Construction Math 1 & 2



Objectives

Part 1: Arithmetic and Geometry

Module 1: Introduction

- Apply the basic functions of arithmetic in construction-based word problems
- Describe the basic geometric shapes and figures commonly encountered in construction
- Explain the function of algebra and working with variables

Module 2: Simple Geometry

- Calculate perimeters of squares and rectangles
- Calculate areas of squares and rectangles
- Calculate volumes of cubes and rectangular prisms

Part 2: Complex Geometry and Conversions

Module 3: Complex Geometry

- Calculate perimeters of triangles, parallelograms, rhombuses and circles
- Calculate areas of triangles, parallelograms, rhombuses and circles
- Calculate volumes of triangular prisms and cylinders

Module 4: Conversions

- Execute conversions between roof slope angles, percentages and pitches
- Execute conversions between metric and imperial units
- Execute conversions between imperial and metric units

Construction Math 1 & 2



COURSE OUTLINE: CONSTRUCTION MATH 1

Module 1: Introduction to Math

Arithmetic

- Functions
- Rounding
- Exercises

Geometry

- Shapes
- Figures
- Exercises

Algebra

- Variables & Formulas
- Pythagoras Theorem
- Exercises

Module 2: Simple Geometry

Length

- Lines and Stations
- Perimeters
- Exercises

Area (Quadrilaterals)

- Floor Plans
- In the Field
- Exercises

Volume (Quadrilaterals)

- Floor Plans
- In the field
- Board Feet
- Exercises

Construction Math 1 & 2



COURSE OUTLINE: CONSTRUCTION MATH 2

Module 3: Complex Geometry

Triangles

- Perimeter
- Area
- Volume
- Exercises

Circles

- Perimeter
- Area
- Volume
- Exercises

Complex Shapes & Figures

- Simplifying Areas
- Simplifying Volumes
- Exercises

Module 4: Conversions

Metric & Imperial

- Length
- Area
- Volume
- Weight/Mass
- Temperature
- Exercises

Ratios

- Ratios
- Slope
- Percentage
- Exercises

Energy

- Energy Units
- Air Movement
- Energy Intensity
- Exercises

Reading House Plans & Construction Drawings



10 - 12 hours to complete with review of content, quizzes, final test and review of downloadable materials.

3 quizzes plus practice exercises
Final test 100 questions
Passing mark on final test = 70

COURSE DESCRIPTION

Reading House Plans and Construction Drawings is for builders, experienced tradespersons, site managers, estimators, project managers, foremen and other construction industry personnel. This course is a comprehensive overview of construction drawings, ideal for those with little or no experience. By the end, you will be able to use house plans to find trade information and perform simple material take offs. Course topics also include an overview of the design process, architectural and engineering scales, floor plans and elevations.

Objectives

Module 1: Overview

- Demonstrate an elementary knowledge of plan reading as it relates to home construction
- Define the importance of communication
- Explain how to navigate a set of construction drawings

Module 2: Floor Plans

- Explain the purpose of plan drawings
- Interpret common architectural symbols and abbreviations
- Locate and identify key features in the plan view

Module 3: Elevations, Sections & Details

- Explain the purpose of elevation, section, and detail drawings
- List the information provided by elevation, section, and detail drawings
- Demonstrate an elementary knowledge of how to find specific information

Reading House Plans & Construction Drawings



COURSE OUTLINE

Module 1: Overview

Plan Reading

- Purpose
- History

Communication

- Language of Symbols
- Design to Construction

Navigating Plans

- Cover Sheet
- 'A' Sheets
- Specifications

Module 2: Floor Plans

Purpose

- A Bird's Eye View
- Orientations

Symbols & Abbreviations

- Line weights
- Dimensions
- Schedules
- Naming conventions
- Dotted lines
- Doors & Windows

Examples & Exercises

- Foundation Plan
- Main Floor Plan
- Upper Floor Plan

Module 3: Elevations, Sections & Details

Elevations

- Ceiling Heights
- Materials
- Roof Pitches

Sections

- Cross-Section
- Wall Section
- Assembly
- References to Other Drawings

Details

- Construction
- Assembly Process
- Finish

High Performance Housing



16 - 20 hours to complete with review of content, quizzes, final test and review of downloadable materials.

6 quizzes plus practice exercises
Final test 100 questions
Passing mark on final test = 70

COURSE DESCRIPTION

High Performance Homes builds on Construction Technology and introduces concepts and techniques of energy efficiency in retrofit and new construction projects. Occupant behaviour, baseloads impact the overall energy use in a house, and affect the sizing of renewable energy systems.

Objectives

Module 1: Strategies and Approaches to High Performance Houses

- Describe the characteristics of a high performance house
- Determine the impact of codes on energy efficiency and housing
- Provide examples of building problems due to poor design and construction
- Describe the benefits of pre-planning and future-proofing

Module 2: New Construction

- Describe key stages in designing and constructing a highly efficient building
- Recognize different types of new construction methods
- Provide examples of high-performance envelope assemblies and systems
- List high-performance mechanical systems

Module 3: Retrofit/Renovation

- List the appropriate sequence of improving the energy efficiency of an existing house
- Describe health hazards that can be uncovered during retrofits
- Describe options for envelope and window retrofits and upgrades
- Explain health and safety issues that can result from mechanical system upgrades

Module 4: Domestic Hot Water

- Describe the purpose of DHW equipment
- Describe the operating principles of DHW
- Identify various types of DHW equipment and ranges of efficiency
- List Opportunities to reduce DHW use

High Performance Housing



Module 5: Occupant Behaviour and Baseloads

- Explain the impact of occupant behaviour on energy use
- List opportunities to reduce total water consumption
- List opportunities to reduce lighting loads
- Describe opportunities to reduce electrical loads

Module 6: Renewable Energy Systems

- Explain the benefits of renewable energy for housing
- Summarize the fundamentals of passive solar design
- Describe general principles of active solar thermal systems
- Describe general principles of on-site generation systems

High Performance Housing



COURSE OUTLINE

Module 1: Introduction

High performance Housing

- Control Layers
- Heating and Cooling Loads
- Energy Use Metrics

Codes & Energy Efficient Housing

- Prescriptive Path
- Performance Path
- Energy Codes

High Performance Programs

- Energy Star/R-2000
- Built Green Canada
- Net Zero/Net Zero Ready
- Passive House

When it Goes Wrong

- Poor Design
- Poor Construction

Anticipating Change

- Flexible Design
- Accessibility
- Preplanning
- Future proofing

Module 2: New Construction

Highly Efficient Buildings

- Building Performance
- Design Stage
- Construction
- Commissioning
- Integrated Design Approach

High Performance Envelopes

- Envelope Assemblies
- Envelope Systems

High Performance Mechanical Systems

- Space Heating & Cooling
- Ventilation
- Matching Loads

Module 3: Retrofits & Renovations

Process

- Sequencing & Scope
- Deferred Maintenance
- Whole House Retrofit
- Trades and Subtrades
- Health & Safety Issues
- Hazardous Materials

Envelope Upgrades

- Foundations
- Walls
- Windows & Doors
- Attics & Roofs

Mechanical System Upgrades

- Space Heating & Cooling
- Fuel Switching
- Ventilation
- Matching Loads

High Performance Housing



Module 4: Domestic Hot Water (DHW)

Typical DHW

- Storage Tanks
- Indirect Tanks
- Instantaneous

Innovative DHW

- Solar Thermal
- Heat Pump
- Combi Systems

Reducing DHW loads

- Design Decisions
- Drainwater Heat Recovery
- Time Delays
- Plumbing Design & Layout

Module 5: Occupant Behaviour & Baseloads

Occupant Behaviour

- Behaviour vs Usage
- Baseloads
- Smart Controls
- Energy Monitors

Reducing Water Usage

- Domestic Hot Water
- Fixtures & Appliances
- Potable Water Reductions

Reducing Electrical Usage

- Lighting
- Appliances
- Electronics
- Phantom Loads
- Mechanical System Loads

Module 6: Renewable Energy Systems

General Principles of Renewable Energy

- Benefits
- Solar Design Primer
- Solar Design in Action

Solar Thermal Systems

- Domestic Hot Water
- Space Heating
- Combi systems

On-site Generation

- PV
- Wind
- Microhydro



CSTS

Construction Safety Training System

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Video: CSTS 2020 *Fundamentals* Preview

[CSTS 2020 Information Sheet \(PDF\)](#)

CSTS 2020 is the upgraded version of CSTS-09. CSTS 2020 consists of [CSTS 2020 *Fundamentals*](#) and optional Add-on Modules.

On its own, [CSTS 2020 *Fundamentals*](#) is an interactive nine-module online course that serves as a general construction site orientation for workers new to the construction industry. And, it takes only 2 to 3 hours to complete.

The job-specific Add-on Modules allow employers to customize the CSTS training to fit their specific site requirements. The modules range between 5 to 15 minutes each and can be taken separately.

CSTS 2020 is mobile-friendly and compatible with most digital devices with access to the internet. This version does not use Adobe Flash.

Add-on Module topics include:

1. [Basic Ladder Safety](#)
2. [Basic Scaffold Safety](#)
3. [Confined Space Awareness](#)
4. [Controlling Hazardous Energy and LOTO](#)
5. [Driving & Journey Management](#)
6. [Environmental Protection](#)
7. [Excavations & Exposing Utilities](#)
8. [Framing Hazards & Controls](#)
9. [Introduction to Respiratory Protection Equipment](#)
10. [Mobile Equipment Awareness](#)
11. [Propane on the Work Site](#)
12. [Pumpjack Scaffolds Safety](#)
13. [Rigging, Hoists, and Cranes](#)
14. [Roofing Hazards and Controls](#)
15. Silica*
16. Transportation of Dangerous Goods*
17. [Types and Uses of Safeguards](#)
18. [Working Around Concrete Pump Trucks](#)
19. [Working At Height](#)
20. [Working Safely with Drywall](#)

*currently in development