

# Principles of Construction Syllabus

## **Course Description/Goals:**

This course provides knowledge of construction safety, construction mathematics, and common hand and power tools. Students will identify and develop professional skills required to work in the construction industry. Course studies include safety standards, recognizing hazards, construction mathematics and measurements, the use and maintenance of hand and power tools, reading construction drawings, material handling, and verbal and written jobsite communication. Students will have the opportunity to complete the OSHA 10-hour training program and earn the NCCER Core certifications.

## **Course TEKS/Objectives:**

Principles of Construction is intended to provide an introduction and lay a solid foundation for those students entering the construction or craft skilled areas. The course provides a strong knowledge of construction safety, construction mathematics, and common hand and power tools. For safety and liability considerations, limiting course enrollment to 15 students is recommended. This course also provides communication and occupation skills to assist the student in obtaining and maintaining employment.

<https://tea.texas.gov/about-tea/laws-and-rules/sboe-rules-tac/sboe-tac-currently-in-effect/ch130b.pdf>

## **Course Outline:**

Semester 1	Semester 2
<p><b>Unit 1: Introduction to the Construction Industry (1 week)</b></p> <ul style="list-style-type: none"><li>• Overview of construction careers and pathways</li><li>• Industry sectors: residential, commercial, industrial,</li></ul>	<p><b>Unit 6: Wood Framing &amp; Carpentry Basics (3–4 weeks)</b></p> <ul style="list-style-type: none"><li>• Floor systems, wall framing, and roof types</li><li>• Stud spacing, sheathing, headers, trusses</li></ul>

infrastructure

- Key roles: general contractor, architect, engineer, subcontractors
- Project: Create a career research poster or presentation

- Framing layout using chalk lines and measuring tools
- Lab: Frame a wall section or mock-up
- Project: Build a small structure or framing model

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### **Unit 2: Construction Safety & OSHA Basics (2–3 weeks)**

- Introduction to job site safety and PPE (Personal Protective Equipment)
- OSHA regulations and hazard communication (HazCom)
- Ladder, scaffolding, and fall protection safety
- Safe tool usage, material handling, fire safety
- **Optional:** OSHA 10-Hour Certification (if available)
- Activity: Safety audit simulation or poster design

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### **Unit 7: Electrical Systems (Introduction) (2 weeks)**

- Basic circuits and wiring diagrams
- Outlets, switches, breakers, and safety devices (GFCIs)
- Tools: wire strippers, testers, pliers
- Lab: Wire a basic light circuit on a practice board

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### **Unit 8: Plumbing Systems (Introduction) (2 weeks)**

- Water supply and drainage systems overview
- Pipe types: PVC, copper, PEX

### **Unit 3: Construction Math & Measurement (2 weeks)**

- Fractions, decimals, conversions, and layout math
  - Using a tape measure, architectural and engineering scales
  - Reading blueprints and basic dimensions
  - Lab: Measuring and marking lumber for accuracy
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### **Unit 4: Tools & Equipment Identification and Use (3 weeks)**

- Hand tools: hammers, saws, levels, screwdrivers, clamps
- Power tools: drills, circular saws, miter saws (shop-safe use)
- Maintenance, inspection, and safe storage
- Activity: Tool identification quiz or scavenger hunt

- Fixtures, fittings, and common plumbing tools
  - Lab: Assemble a basic pipe system or leak test activity
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### **Unit 9: Drywall, Insulation & Interior Finishes (2 weeks)**

- Installing insulation and understanding R-values
  - Hanging and taping drywall
  - Sanding, priming, painting basics
  - Project: Create a finished wall mock-up
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### **Unit 10: Green Building & Construction Technology (2 weeks)**

- Sustainable materials and energy-efficient practices
- LEED principles, solar power, smart systems
- Innovations: 3D printing, prefabrication, BIM (Building

- Lab: Tool use practice and safety checks
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### **Unit 5: Construction Materials & Systems Overview (3 weeks)**

- Common materials: wood, concrete, steel, drywall, fasteners
- Understanding load-bearing vs. non-load-bearing elements
- Intro to structural systems (post-and-beam, platform framing)
- Project: Material comparison board or hands-on sample binder

Information Modeling)

- Project: Design a sustainable tiny house or green remodel plan
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### **Unit 11: Employability Skills & Career Readiness (2 weeks)**

- Soft skills: communication, teamwork, punctuality, problem-solving
- Resume building, job applications, mock interviews
- Understanding job site expectations and ethics
- Activity: Guest speaker or virtual industry tour