

# Construction Technology II

Live Oak High School (052060)

**Submitted:** Mar 22,  
2021

**Decision:** Mar 23, 2021

## Submission Feedback

**APPROVED**

## Basic Course Information

<b>Title:</b>	Construction Technology II
<b>Transcript abbreviations:</b>	Const Tech II/CTE
<b>Length of course:</b>	Full Year
<b>Subject area:</b>	College-Preparatory Elective (G) / Interdisciplinary
<b>UC honors designation?</b>	No
<b>Prerequisites:</b>	construction tech I/CTE (Recommended)
<b>Co-requisites:</b>	None
<b>Integrated (Academics / CTE)?</b>	Yes: Residential and Commercial Construction
<b>Grade levels:</b>	10th, 11th, 12th
<b>Course learning environment:</b>	Classroom Based

## Course Description

## Course overview:

Construction Technology II builds on skills and knowledge gained from the level one course in the Residential and Commercial Pathway. Students continue to grow and develop in the construction trades, explore career opportunities, working on design concept plans and procedures, electrical, green construction, weatherization, wall and roof framing, cabinetry, tile setting, concrete and masonry, and more. Coursework is project-based, providing students with opportunities to develop teamwork and project management skills. The culminating project is a structure that will include: framing, electrical, plumbing, and finish work.

## Course content:

### Unit 1: Design Concept Plans & Procedures

Students will continue to build upon previous blueprint reading knowledge to deepen their learning of building codes and specifications, and demonstrate their knowledge of the foundations of construction math by using appropriate vocabulary and tools to modify a blueprint for construction. Using scale drawings and blueprints, students demonstrate understanding of the rules of similarity and proportions. Students calculate area, and calculate volume of excavation form materials, and concrete. Students calculate framing materials needed from plans, and prepare budgets. Students will be able to identify the commonly used elements in a full set of house plans including building codes, architectural drawing scale and building specifications.

### Unit Assignment(s):

Students interpret and use blueprint dimensions and transfer scale drawings to full scale build. Create blueprints using standard mechanical techniques. Create basic computer generated blueprints using architectural software. Create a reference tool for unfamiliar symbols, notes and abbreviations for quick reference. Students will be able to identify the commonly used elements in a full set of house plans including building codes, architectural drawing scale, and building specifications. Students will be able, through building, to interpret blueprint dimensions to a full scale build. Students will show, through both hand drawing and computer use, how to build a basic blueprint.

### Unit 2: Weatherization

Students research weatherization strategies to make projects more environmentally friendly, and understand the environmental regulations that influence residential design. Students explain the impact of insulation, sealing, heating, ventilation, and HVAC on building performance. Students explain the impact of water conservation and solar thermal on a project.

### **Unit Assignment(s):**

Students will work on a small scale weatherization home that includes the purpose and benefits of the program. Students will learn how homes gain and lose heat energy and how those losses can be reduced by sealing the building shell and by adding insulation. Students will also calculate low flow shower heads and regular flow shower heads to determine the amount of water being used. Students will use Ohm's law to see what light bulb would be more beneficial for the home user to save money.

Example Project: In teams, students create a brochure/manual and/or an infographic poster for homeowners and/or home renters with recommendations for saving energy in the home. This includes insulation, sealing, heating, ventilation, HVAC, water conservation through shower heads, toilets, and faucets, light bulb changes, etc. Students present their work in a student exhibition of learning.

Students will, through written (two-three-page report), verbal (presentation) and demonstration methods, demonstrate knowledge of installation safety, safety work practices, and the variety of materials, supplies and tools required.

## **Unit 3: Foundations & Floor Systems**

This unit describes the layout and construction procedures for floor systems, including how to read and interpret construction drawings and specifications, and how to identify different types of framing systems, floor system components, and floor system materials. It also covers how to estimate the amount of materials needed for a floor assembly and on some common alternative floor systems. Students will learn about raised wood and concrete foundations. Students will explore designs and layouts of foundations and floor systems. Topographical understanding of water mitigation, terrain, and slopes, relative to site layout, will be included.

### **Unit Assignment(s):**

Students will, through written (minimum three-page report) and demonstration methods, identify aspects of framing systems, concrete foundations post and pier structures. Students will understand and identify support, fasteners and seals; identify and analyze load and span data as well as identify different types of bridging and flooring materials.

Students will, through written (two-page report) demonstration methods, perform a slump test for concrete load strength to determine PSI rating. Students will also demonstrate basic site survey competency and layout a building site.

#### **Unit 4: Wall & Roof Framing**

This unit provides an overview of wall, ceiling, and roof framing, including the components of wall, ceiling, and roof framing, the different types of roofs used in residential construction, and the use of trusses in basic roof framing. The methods for laying out rafters, erecting a gable roof, framing a basic gable end wall, and installing roof sheathing are introduced.

Students will be able to identify the main parts of a wall. Students will be able to explain different methods used for framing both outside corners and partition intersections in wall framing. Students will learn and demonstrate rough openings and plate and stud layout. Students will learn how to construct and erect a wall, including materials needed and sheathing. Students will estimate materials required for framing walls, ceiling and sheathing, and construct a four wall system.

#### **Unit Assignment(s):**

- Identify the main parts of a wall through oral and written methods
- Through presentation, explain methods of framing outside corners and partition intersections of wall frames
- Write a two-to-three-page report to demonstrate uses of rough openings
- Demonstrate/list procedures for assembly and installation of an exterior wall
- Demonstrate how to cut and install joists on a wood frame building
- Estimate material requirements of frame walls and ceiling to scope of construction project
- Create a written estimate of materials used in framing and sheathing a roof

## Unit 5: Cabinetry

In this unit students will identify basic tools and equipment used in the cabinet making trade, understand basic techniques, and design and build a sample cabinet using 32mm technology. Students will identify the types of interior finish on built in cabinets for both kitchen and bathroom storage. Students will design a layout and frame for a cabinet. Students will be able to explain how to install prefabricated and plastic laminate surface cabinets and the different types of drawer glides available.

### Unit Assignment(s):

Students will learn about making and assembling a kitchen-type cabinet. The cabinet is a frameless, European-style cabinet. Student will use typical cabinet materials and hardware to build a sample cabinet. Students will also install both base and upper cabinets to industry specification, safely and accurately. They will lay out and frame a cabinet from drawings, explain in oral presentation format how to install a plastic laminate surface, and in written format list the steps for cutting and assembling drawers. Finally, in written and/or presentation format, students will explain the different types of drawer glides, comparing and contrasting when and how they should be used.

## Unit 6: Concrete & Masonry

This unit provides information about basic masonry materials, tools, techniques, and safety precautions; explains how to mix mortar by hand and lay masonry units; and describes the skills, attitudes, and abilities of successful masons. Students will identify and describe basic tools, equipment, and materials used in the concrete and masonry trade. Students will also gain experience in installation techniques: characteristics of block and brick; how to set up, lay out, and bond block and brick; how to cut block and brick; how to lay and tool block and brick; and how to clean block and brick once they have been laid. This module also provides information about masonry reinforcements and accessories that masons use on the job to lay block and brick professionally and safely.

### Unit Assignment(s):

Students will prepare, form, reinforce and pour a concrete slab and curb, while exploring applied science and mathematics in the trade. Students learn about the basic chemistry of mortar and how to mix it properly. Students learn how to cut and lay brick, then build a 3-course concrete block wall.

## Unit 7: Exterior Finishing & Finish Carpentry

In this unit students use a full size window and door trainer to install a pre-hung door and window. They learn to use techniques for applying flashing and using shims, levels, and squares to correctly set the door and window. This unit also covers the various types of exterior finish materials and their installation procedures, including wood, metal, vinyl, and fiber-cement siding.

### Unit Assignment(s):

Students will install a door using the compound miter saw to cut and fit the door casing. They also learn how to use a "coping" saw for crown molding and trim work. They will install three of the most common siding types in the area and estimate the amount of lap or panel siding required for a structure.

Students will use the design cycle to document their research on the different types of sidings and lap or panel siding required for specific structures, for a three-to-five-page report.

## Unit 8: Small House Construction

Students design and build a small house structure. They estimate the cost of the small house project, calculating material requirements from a plan, generating a budget, and preparing a project bid. Students put to practice calculating costs, labor & material costs, project projections, documents, tools & schedules, and estimations vs. final costs. Teams of students construct a small house demonstrating mastery of concepts taught previously in the course.

### Unit Assignment(s):

#### *Example Assignment:*

Teams of students construct a small house demonstrating mastery of concepts taught previously in the course, having previously estimated materials, prepared a bid, and writing a short essay coordinating the phases of construction.

**Projects:**

- Students build small dog houses for use at local animal shelters
- Students build a greenhouse for the school or a local elementary school
- Students build an outdoor shed/studio to be auctioned off

Students will use the design cycle to document their research and designs for a three-to-five-page group report.

## Course Materials

### Textbooks

Title	Author	Publisher	Edition	Website	Primary
Carpentry Level 1 Trainee Guide,	NCCER	Pearson	5th/2013	[ empty ]	Yes

## Additional Information

**Course Author:**

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