

# Construction Technology Course Outline/Syllabus

**Instructor:** Mr. James Henderson Kennedy High School

## **COURSE DESCRIPTION**

Students have hands-on opportunities to learn all phases of basic residential construction, including carpentry, drywall, electrical, flooring, painting, plumbing, roofing, masonry, welding, and reading blueprints. During the first part of the course, students learn about construction safety, foundations, framing, and proper use of tools. Then students have the opportunity to make practical application of their classroom studies on a construction project. Projects may include building sawhorses, scale model houses, storage sheds, remodeling (on or off-site), simulated bathroom construction, and other projects (Play Houses) as available.

This competency-based course prepares students for entry-level positions in the construction industry. Integrated throughout the course are career technical education standards which include basic academic skills, communication, career planning, technology, problem solving, safety, responsibility, ethics, teamwork, and technical knowledge.

## **STUDENT PERFORMANCE OBJECTIVES**

Upon successful completion of the course, students will:

- 1) Understand and apply measurement systems in the planning and layout process used in the residential construction industry.
- 2) Demonstrate the safe and appropriate use of hand tools common to the construction industry, such as hammers, torches, pliers, wire cutters, pipe cutters, saws, chisels, and wrenches
- 3) Demonstrate safe and appropriate use of power tools common to the construction industry, such as band saw, saber saw, miter compound saw, radial arm saw, table saw, jig saw, cut-off saw, reciprocating saw, portable drill, drill press, planer, roto hammer, router, jointer, belt sander, and finishing sanders
- 4) Practice occupational safety on the construction site, whether classroom or job site
- 5) Demonstrate competency in the mathematics used in measuring and estimating the materials needed for a job
- 6) Demonstrate communication, teamwork, and leadership skills in project development
- 7) Demonstrate familiarity with skills in the following areas: carpentry, electrical wiring, plumbing, masonry, plastering
- 8) Identify different building materials and types of wood used in construction
- 9) Understand the process of building layout, foundations, and framing
- 10) Understand the career pathways available in the construction trades, including further training and apprenticeship opportunities

### **Complete class projects, such as:**

- a) Read and draw plans for various projects
- b) Build and frame a full wall section, a full-size roof frame, a 2' x 2' model house, or a storage shed
- c) Sheetrock a wall and a partition; patch and repair; paint the wall
- d) Build mock-up for wiring system, including wiring outlets and lights
- e) Build mock-up for plumbing system; weld or solder copper tubing and plastic ABS tubing

### ***Expected School-wide Learning Results***

1. Demonstrate effective skills in oral and written communication.
2. Demonstrate job skills and the behavior and work ethic valued by employers.
3. Demonstrate the ability to be critical, complex, and creative thinkers.
4. Work productively both as individuals and as team members.

### **A. Introduction**

#### **1. Introduction to the construction industry**

- a. Review historical trends
- b. Discuss environmental regulations
- c. Discuss career opportunities

#### **2. Safety Unit**

- a. Review safety rules and policies
- b. Review emergency guidelines
- c. Demonstrate safe handling of equipment and tools
- d. Identify and select tools for specific jobs
- e. Know procedures for cleaning and care for tools and equipment
- f. Demonstrate proficiency in the safe use of hand tools and power tools
- g. List safety measures relating to shoring and scaffolding
- h. Describe proper methods of lifting and carrying to avoid injury

#### **3. Practice construction math skills**

- a. Work with measurements and fractions
- b. Practice converting decimals to fractions
- c. Calculate area
- d. Estimate amount of wood needed to build a certain project
- e. Estimate materials needed to build a certain project
- f. Estimate cost to build a certain project
- g. Practice making the following angles: acute, right, obtuse, straight
- h. Solve basic math problems related to carpentry
- i. Solve problems using board, linear, foot, square-foot, and cubic-foot measurements
- j. Measure horizontal and vertical surfaces, using feet plus inches

#### **4. Hand tools**

- a. Identify the most common hand tools
- b. Select the proper hand tool for a given job

- c. Explain proper methods of tool maintenance and storage
- d. Demonstrate safe handling of the following tools:
  - 1) Measuring and layout tools
  - 2) Saws and blades
  - 3) Planing, smoothing, and shaping tools
  - 4) Drilling and boring tools
  - 5) Fastening tools
  - 6) Prying tools
  - 7) Gripping and clamping tools

## 5. Power tools

- a. Recognize common power tools
- b. Explain the function and operation of the principal power tools
- c. Identify the parts of common power tools
- d. Demonstrate safe handling of the power tools

### Wall and ceiling framing

- Identify the main parts of a wall frame
- Show how rough openings are handled in wall construction
- Explain plate and stud layout
- Describe the construction and erection of wall sections and partitions
- List the materials commonly used for sheathing
- Demonstrate the process of ceiling frame construction
- Estimate materials required for wall frames, ceiling frames, and sheathing

### Electrical wiring

- Define basic electrical terms
- Explain what is included in an electrical wiring system
- List the tools, devices, and materials required to do electrical wiring in a residential building
- Demonstrate understanding of basic circuit theory
- Use approved methods for simple wiring installation tasks
- Perform simple electrical troubleshooting

### Plumbing systems

- Cite codes that govern the installation of plumbing systems
- List necessary plumbing tools and explain how to use them
- Describe the different types of materials used in plumbing systems
- Explain the proper design and installation of basic plumbing system
- Read plumbing prints
- Cite safety measures that plumbers must observe

## **METHODS, STRATEGIES AND TECHNIQUES**

A variety of strategies and techniques are used to instruct the students, including:

- Direct instruction (demonstrations, lecture, small group discussion, selected readings)
- Project-based learning
- Embedded assessments
- Collaborative learning opportunities
- Use of community resources including guest speakers, mentors, and field trips
- Peer coaching and student mentoring
- Hands-on experience
- Group and individual projects

### **Text Book and Resources:**

*Modern Carpentry, 11<sup>th</sup> edition*, by Willis Wagner and Howard Smith, Goodheart-Willcox Co., 2008

## **ASSESSMENT OF STUDENT PERFORMANCE**

Assessment of student performance includes but is not limited to:

- Work ethics, punctuality and attendance
- Classroom participation and effort
- Mastery of skills and quality of work
- Group and individual projects
- Written and practical skills testing
- Industry-related tests
- Notebook

## **Grading Rubric:**

Grading is based on teacher observation of the students work. There are two basic categories that the teacher bases student grades on; the first is student behavior, and second is the student work skills and finish project. Construction work is a team effort and for one team member to be laden with all the work is entirely unfair to that team member. Therefore, the teacher will give an A grade to that team member that does all the work and the other team members who do not work will receive an F grade.

### **Student Behavior**

40% of student's grade is behavior.

Behavior is the following of school rules, classroom norms, contract rules, general shop rules, machine safety rules, attendance, and tardies. Any violation of the above will cause the student grade to drop; particularly, disrespecting the instructor/teacher in classroom and shop. They are there to keep you safe from

injury, and the teacher/instructor is there to inform how to stay safe. So please listen to your teacher/instructor instructions and directions. Failure to help clean shop will lead to an “F” grade or the lowering of your grade for course.

### **Student Work Skills and Finish Work**

60% of student’s grade is finished projects if applicable to that quarter grading. Grading Rubric will be supplied before shop work begins.

## **Grading Percentage**

<b>100%</b>	<b>-90%</b>	<b>A</b>
<b>89%</b>	<b>-80%</b>	<b>B</b>
<b>79%</b>	<b>-70%</b>	<b>C</b>
<b>69%</b>	<b>-60%</b>	<b>D</b>
<b>59%-Lower</b>		<b>F</b>