

Home Improvement I & II

Program Description: The Home Improvement course of study provides students with an opportunity to learn theory and skills for use in residential carpentry, masonry, electrical, and plumbing,. Competencies include skills and knowledge related to understanding all aspects of the industry and the tools necessary to complete those skills. This course of study utilizes the National Center for Construction Education and Research (NCCER) curriculum for Construction Technology. All students must pass the NCCER Core safety examination prior to performing projects in the laboratory setting. All students wear protective clothing and gear appropriate for work in the construction industry.

Module 1: Distance Measurement and Leveling

Unit Objective: Students will demonstrate an understanding of the equipment and procedures necessary for site layout.

Unit Competencies:

1. Convert measurements stated in feet and inches to equivalent measurements in decimal feet.
2. Demonstrate proper use and maintain tools and equipment associated with taping and leveling.
3. Identify manual or electronic equipment and procedures to make distant measurements and perform site layout tasks.
4. Determine site and building elevations using various leveling procedures.
5. Analyze site layout data and information in field notes.

Module 2: Introduction to Concrete, Reinforcing Materials, and Forms

Unit Objective: Students will demonstrate competency in construction applications using cement.

Unit Competencies:

1. Identify the properties of cement.
2. Describe the composition of concrete.
3. Perform volume estimates for concrete quantity requirements.
4. Identify the types of concrete reinforcement materials and their uses.
5. Identify various types of footings, and forms.
6. Explain and demonstrate the safety procedures associated with the construction and use of concrete forms.
7. Demonstrate methods to erect, plumb, and brace a simple concrete form with reinforcement.
8. Demonstrate how to use a screed to strike off and level concrete to the proper grade in a form.
9. Demonstrate how to use tools for placing, floating, and finishing concrete.
10. Demonstrate safe care and use of hand and power tools used when working with concrete.

Module 3: Introduction to Masonry, Units and Installation Techniques

Unit Objective: Students will demonstrate an understanding of the materials and procedures used in working as a mason.

Unit Competencies:

1. Describe the materials and methods used in masonry today and historically.
2. Identify the skills, attitudes and abilities necessary to be successful as a mason.
3. Demonstrate safety procedures for the work site.
4. Perform bricklaying procedures involving mixing mortar, laying a mortar bed and laying bricks.
5. Describe and demonstrate how to set up a wall.
6. Demonstrate laying a dry bond, spread and furrow a bed joint, and butter masonry units.
7. Demonstrate cutting brick and block accurately.

8. Demonstrate the ability to lay masonry units in a true course.

Module 4: Floor Systems

Unit Objective: Students will be able to perform the tasks necessary to install a floor system.

Unit Competencies:

1. Read, interpret drawings and identify the different types of floor systems and requirements.
2. Determine the materials needed to erect a specific floor system.
3. Estimate the amount of material needed to frame a floor assembly.
4. Demonstrate the ability to lay out and construct a floor assembly including bridging, joists for a cantilever floor, sub flooring and tongue-and-groove plywood.

Module 5: Wall and Ceiling and Roof Framing

Unit Objective: Students will be able to perform the tasks necessary to install walls, ceilings and roof systems.

Unit Competencies:

1. Identify the components of a wall and ceiling layout.
2. Demonstrate the procedure for laying out ceiling joists.
3. Describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition T's, bracing and fire stops.
4. Describe the correct procedure for assembling and erecting an exterior wall.
5. Estimate the materials used in framing and sheathing walls and a roof.
6. Describe the materials and methods used for installing sheathing on walls and roofs.
Identify the methods used to calculate the length of a rafter.
7. Layout, assemble, erect and brace exterior walls for a frame building.
8. Identify the roof framing members used in gable and hip roofs.
9. Identify the types of trusses used in roof framing.
10. Layout a roof using by demonstrating the proper use of tools associated with roof construction.
11. Frame a roof opening and a gable roof with vent openings.
12. Erect a gable roof using trusses.

Module 6: Exterior Finishing

Unit Objective: Students will demonstrate a basic understanding of exterior finishing.

Unit Competencies:

1. Describe the purpose of wall insulation and flashing.
2. Demonstrate installation of common cornices.
3. Describe types and styles of wood, vinyl and metal siding.

Module 7: Basic Stair Layout

Unit Objective: Students will describe and demonstrate proper stair layout.

Unit Competencies:

1. Identify the types and parts of stairs.
2. Identify the materials used in the construction of stairs.
3. Read and interpret construction drawings of stairs.
4. Calculate the total rise, number and size of risers and number and size of treads required for a stairway.
5. Demonstrate laying out and cutting stringers, risers and treads.

6. Properly build a small stair unit with a temporary handrail.

Module 8: Electrical Safety

Unit Objective: Students will identify and follow safe work practices.

Unit Competencies:

1. Demonstrate the importance and proper use of personal protection equipment (PPE).
2. Demonstrate an understanding of safe operation and practices in the work area.
3. Recognize hazards and demonstrate safe working procedures and requirements.
4. Demonstrate the proper use of precautionary labeling and Material Safety Data Sheets (MSDS).
5. Demonstrate the proper use of ladders, scaffolds and stairs.

Module 9: Residential Electrical Services

Unit Objective: Students will demonstrate competency of residential electrical services.

Unit Competencies:

1. Demonstrate competency in interpreting the NEC and determining electric service requirements.
2. Explain grounding requirements.
3. Calculate and select service-entrance equipment.
4. Select proper wiring methods for various types of residences.
5. Compute branch circuit loads and explain installation requirements.
6. Explain the types and purposes of equipment grounding conductors.
7. Explain the purpose and installation of ground fault circuit interrupters.
8. Size outlet boxes and select proper type for different wiring methods.
9. Explain how wiring devices are selected and installed.
10. Demonstrate use of electrical test equipment.
11. Select the appropriate meter based on category ratings.
12. Identify the safety hazards associated with test equipment.

Module 10: Introduction to Heating, Ventilation, and Air Conditioning (HVAC)

Unit Objective: Students will demonstrate a basic understanding of the HVAC profession.

Unit Competencies:

1. Understand and apply the basic principles of heating, ventilation and air conditioning.
2. Define the purpose and objectives of an apprentice training school.
3. Define the Clean Air Act and the purpose it serves in industry.
4. Describe the types of regulatory codes encountered in HVAC.
5. Identify the types of schedules/drawings used in the HVAC profession.

Module 11: Introduction to Drain, Waste, and Vent (DWV) Systems

Unit Objective: Students will demonstrate an understanding of the components and functions of various drain, waste and vent systems.

Unit Competencies:

1. Explain how waste moves from a fixture through the drain system to the environment.
2. Identify the major components of a drainage system and describe their functions.
3. Identify the different types of traps and their components, explain the importance of traps and identify the ways that traps can lose their seals.
4. Identify the various types of drain, waste and vent (DWV) fittings and describe their applications.
5. Identify significant code and health issues, violations and consequences related to DWV systems.

Module 12: Plastic Pipe and Fittings

Unit Objective: Students will demonstrate competency in the use and application of plastic pipe and fittings.

Unit Competencies:

1. Identify types of materials and schedules of plastic piping.
2. Identify proper and improper application of plastic piping.
3. Identify types of fittings and valves used with plastic piping
4. Identify and determine the kinds of hangers and supports needed for plastic piping.
5. Correctly measure, cut and join plastic piping.
6. Demonstrate proper procedures for the handling, storage and protection of plastic pipes.

Module 13: Copper Pipe and Fittings

Unit Objective: Students will demonstrate competency in working with copper pipe and fittings.

Unit Competencies:

1. Identify the types of materials and schedules used with copper piping.
2. Identify the material properties, storage, and handling requirements of copper piping.
3. Identify the types of fittings and valves used with copper piping.
4. Identify the techniques used in hanging and supporting copper piping
5. Accurately measure, ream, cut and join copper piping.
6. Identify the hazards and safety precautions associated with copper piping.

**Certifications: NCCER Safety
OSHA-10 Safety**