

# Agricultural Systems and Technology II

**Levels:** Grades 10-12  
**Units of Credit:** 1.00  
**CIP Code:** 010221  
**Core Code:** 30-01-00-00-040  
**Prerequisite:** None  
**Skill Test:** # 113

## **COURSE DESCRIPTION**

Students will learn basic skills needed to select, operate, maintain, service, sell, and use agricultural, power units, machinery, equipments, structures, and utilities. It includes instruction in agricultural power units; the planning and selection of materials for the construction of agricultural facilities; and the mechanical practices associated with irrigation, drainage, run-off, water conservation, erosion control, and farm welding, including oxy-fuel and arc welding, and other agricultural mechanization applications. The course will also include field or laboratory applications of concepts being taught.

## **CORE STANDARDS, OBJECTIVES, AND INDICATORS**

### **STANDARD 1**

**Students will develop an understanding of the role of FFA in Agricultural Education Programs.**

**Objective 1:** Explain FFA officer duties and responsibilities.

- a. Describe the duties and responsibilities of chapter FFA officers.
- b. Explain the proper dress and characteristics of a good FFA leader.

**Objective 2:** Plan and organize an FFA meeting.

- a. Explain how to plan a meeting and develop the order of business.
- b. Describe how to set up the meeting room.
- c. Explain the parliamentary procedure used in an FFA meeting.

### **STANDARD 2**

**Students will understand the benefits of a Supervised Agricultural Experience (SAE) Programs.**

**Objective 1:** Keep and use SAE records.

- a. Explain how SAE records are organized.
- b. Identify the procedures to making entries in the SAE records.
- c. Explain how to summarize and analyze the SAE records.

**Objective 2:** Make long range plans for expanding SAE Programs.

- a. Identify the factors that should be considered in expanding an SAE program.
- b. Explain how placement and ownership SAE programs may be expanded.

### **STANDARD 3**

**Students will identify hazards in Agricultural Mechanics.**

**Objective 1:** Identify the three conditions necessary for combustion.

**Objective 2:** Explain how to prevent fires in agricultural mechanics.

**Objective 3:** Identify the different classes of fires and the different types of fire extinguishers.

**Objective 4:** Describe the proper use of fire extinguishers.

**Objective 5:** Describe the different types of burns that can occur in agricultural mechanics.

#### **STANDARD 4**

**Students will demonstrate safe practices when working in laboratories and other enclosed facilities and when operating and working around laboratory equipment, materials, and chemicals.**

**Objective 1:** Explain how to create a safe place to work.

**Objective 2:** Describe what each safety color means and where it is used.

**Objective 3:** Describe how to select appropriate protective clothing and devices for personal protection.

#### **STANDARD 5**

**Students will demonstrate basic electrical wiring skills and knowledge about electricity.**

**Objective 1:** Explain electricity and identify safety practices that should be observed in doing electrical work.

**Objective 2:** Explore the science of electricity.

**Objective 3:** Measure electrical voltage, amperage and resistance.

**Objective 4:** Identify electrical tools and equipment.

**Objective 5:** Compare single-phase and three-phase systems.

**Objective 6:** Prepare and use schematics.

**Objective 7:** Wire circuits.

**Objective 8:** Repair and replace electrical cord.

#### **STANDARD 6**

**Students will maintain battery systems that supply energy to engines and accessories.**

**Objective 1:** Charge the battery with a battery charger.

**Objective 2:** Clean and maintain the battery terminals, cables, and battery box.

**Objective 3:** Replace fuses, circuit breakers, and light bulbs.

**Objective 4:** Use electrical test light to identify properly operating circuits.

**Objective 5:** Wire direct current electrical circuits.

**Objective 6:** Install a battery.

#### **STANDARD 7**

**Students will repair, recondition, and safely operate hand and power tools.**

**Objective 1:** Safely use portable and stationary power tools.

**Objective 2:** Sharpen, recondition, maintain, and properly store tools.

#### **STANDARD 8**

**Students will plan and construct with concrete.**

**Objective 1:** Plan a job using concrete.

**Objective 2:** Select concrete tools.

**Objective 3:** Prepare the site for the concrete pour.

**Objective 4:** Take place, finish, and cure concrete.

**Objective 5:** Lay out the footings of a building.

**Objective 6:** Construct buildings or building components with concrete.

**Objective 7:** Build, set, and remove concrete forms.

**Objective 8:** Determine the amount of materials required to install a fence.

**STANDARD 9**

**Students will safely operate and maintain agricultural equipment.**

**Objective 1:** Conduct a pre-operation inspection of a tractor.

**Objective 2:** Observe warm-up and cool-down procedures of engines and machines.

**Objective 3:** Inflate tires to proper air pressure for optimum performance.

**Objective 4:** Describe the principles of operation of the internal combustion engines.

**Objective 5:** Identify engine systems and their respective functions.

**Objective 6:** Perform recommended periodic service jobs and maintain records of equipment maintenance and repair.

**Objective 7:** Use various equipment and machinery operator and repair manuals.

**Objective 8:** Pack bearings and remove and replace grease seals.

**Objective 9:** Properly lubricate equipment before operation and storage.

**Objective 10:** Select, maintain, repair and operate small engines.

- a. Schedule and replace fluids and filters.
- b. Troubleshoot engine problems.
- c. Clean and adjust carburetor for optimum performance.
- d. Adjust throttle and choke linkages.
- e. Service battery.
- f. Service fuel strainer.
- g. Service crankcase breathers.

**STANDARD 10:**

**Students will service and maintain engine and drive systems.**

**Objective 1:** Service cooling systems.

- a. Test antifreeze.
- b. Inspect and replace hoses.
- c. Service fan belts.
- d. Replace thermostat.

- e. Replace water pump.
- f. Inspect for leaks.
- g. Flush cooling system.
- h. Clean exterior of radiator.

**Objective 2:** Service drive assemblies.

- a. Follow general preventive maintenance program.
- b. Replace belts.
- c. Recognize malfunctions of drive assemblies.
- d. Clean and lubricate drive parts.
- e. Replace gaskets.
- f. Replace and adjust chains.
- g. Clean sprockets, chains, and gears.

**Objective 3:** Service hydraulic systems.

- a. Check hydraulic system for leaks.
- b. Inspect and replace lines/hoses of the hydraulic system.
- c. Drain, clean, flush, and refill hydraulic system.

**STANDARD 11:**

**Students will select, maintain, and safely operate oxyfuel, shielded metallic arc welding (SMAW), and gaseous metallic arc (GMAW) welding systems.**

**Objective 1:** Weld mild steel in horizontal and vertical positions.

**Objective 2:** Weld butt welds in horizontal and vertical positions.

**Objective 3:** Weld fillet welds in horizontal and vertical positions.

**Objective 4:** Weld lap welds in horizontal and vertical positions.

**Objective 5:** Estimate and calculate the cost of welding materials.

**STANDARD 12:**

**Students will fabricate with metal.**

**Objective 1:** Cut threads with taps and die tools.

**Objective 2:** Cut, thread and assemble steel pipe.

**Objective 3:** Connect flare and compression fittings.

**Objective 4:** Prepare grinding and sharpening equipment.

**Objective 5:** Fabricate shop projects using metal.