

## Agricultural Engineering

**Course Description:** Agricultural Engineering includes standards on metal fabrication and agriculture structures. Subject matter will include hot/cold metal work, cost and material computation, electrical wiring, engine service and repair, blueprint reading, drawing and selection of appropriate materials for projects.

**Recommend Prerequisite:** Agriscience (HQ), Principles of Agricultural Sciences or Principles of Horticultural Sciences

**Recommended Credit(s):** 1 or 2

**Recommended Grade Level:** 11<sup>th</sup> or 12<sup>th</sup>

**Course Codes:** (2009-2010) A10 – 5128 or A12 – 5178  
(2010-2015) A12 – 5178

**Note:** (2011-15) – 5178 reordered standards to align with EIS (e-tiger):  
Standard 3 was changed to Standard 5  
Standard 4 was changed to Standard 6  
Standard 5 was changed to Standard 3  
Standard 6 was changed to Standard 4

## **Agricultural Engineering**

### **Standard 1.0**

**Evaluate career options in the area of agricultural engineering.**

### **Standard 2.0**

**Systematically determine the correct operational procedures for advanced metal fabrication and welding.**

### **Standard 3.0**

**Evaluate the principles of electricity, including electrical wiring, equipment and motors.**

### **Standard 4.0**

**Utilize the principles and techniques involved in the construction of agricultural structures.**

### **Standard 5.0**

**Integrate core academic competencies in the area of agricultural engineering.**

### **Standard 6.0**

**Demonstrate premier leadership and personal growth needed for career success and advancement in the area of agricultural engineering.**

## **Agricultural Engineering**

**Course Description:** Agricultural Engineering includes standards on metal fabrication and agriculture structures. Subject matter will include hot/cold metal work, cost and material computation, electrical wiring, engine service and repair, blueprint reading, drawing and selection of appropriate materials for projects.

### **Standard 1.0**

#### **Evaluate career options in the area of agricultural engineering.**

Learning Expectations and Performance Indicators:

- |     |   |   |
|-----|---|---|
| 1.1 | Research and prepare a written report on career goals related to agricultural engineering.                              | 1 |
| 1.2 | Prepare a career plan for a related area in agricultural engineering.   | 1 |
| 1.3 | Research utilizing current resources to develop a written report on career opportunities in agricultural manufacturing. | 1 |

### **Standard 2.0**

#### **Systematically determine the correct operational procedures for advanced metal fabrication and welding.**

Learning Expectations and Performance Indicators:

- |     |  |   |
|-----|--|---|
| 2.1 | Demonstrate and explain the proper use of gas cutting and welding equipment.                     | 1 |
| 2.2 | Demonstrate and explain the proper use of Arc welding equipment.                                 | 1 |
| 2.3 | Demonstrate and explain the proper use of MIG welding equipment.                                 | 1 |
| 2.4 | Demonstrate and explain the principles and techniques involved in blueprint reading and drawing. | 1 |
| 2.5 | Develop a written bill of materials and project costs.   | 1 |
| 2.6 | Utilize principles of advanced metal fabrication.  | 1 |
| 2.7 | Utilize metal working tools and machines to complete projects.                                   | 1 |
| 2.8 | Demonstrate approved safety practices in a shop/lab environment.                                 | 1 |
| 2.9 | Complete a safety test with 100 percent accuracy.  | 1 |

### **Standard 3.0**

#### **Evaluate the principles of electricity, including electrical wiring, equipment and motors.**

Learning Expectations and Performance Indicators:

- |     |  |   |
|-----|--|---|
| 3.1 | Explain the proper wiring of a circuit breaker panel.                              | 2 |
| 3.2 | Read and interpret a house-wiring diagram.   | 2 |
| 3.3 | Develop a bill of materials and project costs for an electrical project.           | 2 |
| 3.4 | Use electrical tools properly.   | 2 |
| 3.5 | Read and interpret blueprints, drawings, electrical codes and electrical diagrams. | 2 |

### **Standard 4.0**

#### **Utilize the principles and techniques involved in the construction of agricultural structures.**

Learning Expectations and Performance Indicators:

- |     |   |   |
|-----|---|---|
| 4.1 | Compare the advantages and disadvantages of different types of siding.  | 2 |
| 4.2 | Compare the advantages and disadvantages of different types of roofing. | 2 |
| 4.3 | Determine the importance of stress loads of different materials.        | 2 |
| 4.4 | Evaluate the use of different types of foundations.                     | 2 |
| 4.5 | Examine methods of finishing concrete and laying cinder blocks.         | 2 |

4.6 Write project plan and costs of constructing agriculture buildings. 2

**Standard 5.0**

**Integrate core academic competencies in the area of agricultural engineering.**

Learning Expectations and Performance Indicators:

- |     |  |   |
|-----|--|---|
| 5.1 | Calculate construction problems using algebraic formulas           | 1 |
| 5.2 | Solve arithmetical problems related to construction.               | 1 |
| 5.3 | Solve speed, time, and distance problems.                          | 1 |
| 5.4 | Solve problems relating to volume, area and linear measurement.    | 1 |
| 5.5 | Explain the conversion of chemical energy to mechanical energy.    | 1 |
| 5.6 | Describe the difference in strengths of various species of lumber. | 1 |

**Standard 6.0**

**Demonstrate premier leadership and personal growth needed for career success and advancement in the area of agricultural engineering.**

Learning Expectations and Performance Indicators:

- |     |  |   |
|-----|--|---|
| 6.1 | Demonstrate positive work attitudes and behaviors based on the FFA code of ethics.                                 | 1 |
| 6.2 | Describe career plans that reflect permanent learning.   | 1 |
| 6.3 | Demonstrate correct time management skills.  | 1 |
| 6.4 | Help others learn in order to achieve goals and expectations through a supervised agricultural experience program. | 1 |
| 6.5 | Prepare to participate in FFA Agriculture Mechanics Career Development Events.                                     | 1 |