# Agricultural Structures Course No. 18403 Credit: 1.0

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| --- | --- | --- | --- |
| **Student name:**  |  | **Graduation Date:** |  |

Pathways and CIP Codes:Power, Structural & Technical Systems (01.0201)

Course Description:

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 1: Click or tap here to enter text.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Identify types of electrical current |  |
| 1.2 | Identify two different sources of electrical energy  |  |
| 1.3 | Define electromagnetic induction  |  |
| 1.4 | Diagram how electricity is created in a generator  |  |
| 1.5 | Describe the importance of free electrons in electrical flow  |  |
| 1.6 | Graph alternating and direct current waves  |  |
| 1.7 | Explain the difference between single and three-phase electricity |  |
| 1.8 | Describe how step-up transformers work |  |
| 1.9 | Describe how step-down transformers work |  |

## Benchmark 2: Electrical Circuit Theory

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | List the four components of a circuit |  |
| 2.2 | Define voltage, amperage, wattage, resistance, conductor, insulator |  |
| 2.3 | Give three examples of conductors and insulators |  |
| 2.4 | Describe the effect of length and thickness of a conductor on the resistance level  |  |
| 2.5 | Diagram series, parallel, and combination circuits |  |
| 2.6 | Explain Ohm’s law |  |
| 2.7 | Calculate missing values using Ohm’s law  |  |
| 2.8 | Define power |  |
| 2.9 | Calculate amperage, voltage, resistance, and power of series, parallel, and combination circuits  |  |

## Benchmark 3: Electrical Circuit Components

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Identify wire sizes according to the numbering system |  |
| 3.2 | Identify uses for different common wire sizes |  |
| 3.3 | Calculate voltage drop  |  |
| 3.4 | Identify wire insulation colors and uses |  |
| 3.5 | List and describe devices that control circuits |  |
| 3.6 | Identify purposes of various switch types |  |

## Benchmark 4: Tools for the Electrician

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | Identify essential tools for the electrician |  |
| 4.2 | Demonstrate proper use of electrical tools |  |
| 4.3 | Identify functions of electrical tools on the job site |  |

## Benchmark 5: Click or tap here to enter text.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 5.1 | Identify the effects of electrical shock |  |
| 5.2 | Describe how to help a shock victim  |  |
| 5.3 | Describe why circuits must be grounded |  |
| 5.4 | Define short circuit |  |
| 5.5 | Define system grounding |  |
| 5.6 | Diagram a properly grounded circuit |  |
| 5.7 | Describe the purpose of a Ground Fault Circuit Interrupter receptacle  |  |
| 5.8 | Properly install a GFCI receptacle  |  |
| 5.9 | Describe the purpose of an Arc Fault Circuit Interrupter  |  |
| 5.10 | Properly install an AFCI breaker |  |

## Benchmark 6: Reading Wiring Diagrams & Electrical Symbols

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 6.1 | Identify universal electrical symbols |  |
| 6.2 | Determine where each electrical symbol would be used in a floor plan |  |
| 6.3 | Use electrical symbols to create a wiring diagram on a house floor plan |  |

## Benchmark 7: Electricity Board Practice Wiring

### Competencies

| **#** | **Description** | **RATING** |
| --- | --- | --- |
| 7.1 | Install electrical boxes and components on electrical boards |  |
| 7.2 | Correctly wire eight circuits on the electrical boards. |  |
| 7.3 | Correctly test each circuit after wiring. |  |
| 7.4 | Calculate voltage and amperage on each circuit after wiring |  |

## Benchmark 8: Electrical Code

### Competencies

| **#** | **Description** | **RATING** |
| --- | --- | --- |
| 8.1 | Describe the purpose of the National Electrical Code |  |
| 8.2 | Look up assigned items in the National Electrical Code  |  |
| 8.3 | Demonstrate understanding of selected items from the National Electrical Code such as receptacle height, switch height, GFCI and AFCI restrictions, roughing in stipulations, and voltage and amperage draw. |  |
| 8.4 | Apply items from the National Electrical Code to the wiring project |  |
| 8.5 | Create a sample wall to wire according to the National Electrical Code |  |

## Benchmark 9: Wiring Project

### Competencies

| **#** | **Description** | **Rating** |
| --- | --- | --- |
| 9.1 | Apply all items learned this year in wiring the project selected |  |
| 9.2 | Demonstrate skills in roughing in wiring |  |
| 9.3 | Demonstrate skills in electrical troubleshooting |  |
| 9.4 | Demonstrate skills in installing electrical fixtures and components |  |

## Benchmark 10: Careers in Electricity & Ag Structures

### Competencies

| **#** | **Description** | **rating** |
| --- | --- | --- |
| 10.1 | Identify potential careers in the electrical and ag structures fields  |  |
| 10.2 | Explore post-secondary opportunities for electrical or ag structures education  |  |
| 10.3 | Explore steps to obtain an electrical certification  |  |
| 10.4 | Create and deliver a presentation over one career in the electrical or ag structures field. (CD)  |  |

## Benchmark 11: Ag Structures Safety

### Competencies

| **#** | **Description** | **Rating** |
| --- | --- | --- |
| 11.1 | List and describe appropriate clothing suitable for carpenters  |  |
| 11.2 | List personal safety equipment recommended for construction  |  |
| 11.3 | Identify safety measures relating to hand and power tools  |  |
| 11.4 | Explain housekeeping measures designed to promote safe working conditions  |  |
| 11.5 | Detail safe practices in handling and working pressure-treated lumber  |  |
| 11.6 | Describe classes of fires  |  |
| 11.7 | Recommend practices that help prevent fires |  |

## Benchmark 12: Wall & Ceiling Framing

### Competencies

| **#** | **Description** | **Rating** |
| --- | --- | --- |
| 12.1 | Identify the main parts of a wall frame  |  |
| 12.2 | Explain methods of forming the outside corners and partition intersections of wall frames  |  |
| 12.3 | Demonstrate how rough openings are handled in wall construction  |  |
| 12.4 | Explain plate and stud layout  |  |
| 12.5 | Describe the construction and erection of wall sections and partitions  |  |
| 12.6 | List the materials commonly used for sheathing  |  |
| 12.7 | Demonstrate the process of ceiling frame construction |  |
| 12.8 | Explain construction of walls using metal studs  |  |
| 12.9 | Estimate materials required for wall frames, ceiling frames, and sheathing |  |

## Benchmark 13: Roofing Materials & Methods

### Competencies

| **#** | **Description** | **Rating** |
| --- | --- | --- |
| 13.1 | List the covering materials commonly used for sloping roofs  |  |
| 13.2 | Define terms associated with roofing  |  |
| 13.3 | Describe how to prepare the roof deck  |  |
| 13.4 | Describe re-roofing procedures for both asphalt and wood shingles |  |
| 13.5 | Illustrate correct nailing patterns  |  |
| 13.6 | Select appropriate roofing materials for various slopes and conditions  |  |
| 13.7 | Explain how various roofing products are applied  |  |
| 13.8 | Demonstrate the proper positioning of gutters  |  |
| 13.9 | Estimate materials needed  |  |

## Benchmark 14: Building Finishing

### Competencies

| **#** | **Description** | **Rating** |
| --- | --- | --- |
| 14.1 | List tools and equipment and demonstrate their various use  |  |
| 14.2 | Select proper materials for various painting and finishing jobs  |  |
| 14.3 | Prepare exterior and interior surfaces for painting  |  |
| 14.4 | Paint Surfaces |  |
| 14.5 | Select proper materials for exterior building finishing |  |
| 14.6 | Demonstrate use of finish woodworking tools |  |
| 14.7 | Create trim for part of the project |  |

## Benchmark 15: Storage Shed Construction

### Competencies

| **#** | **Description** | **Rating** |
| --- | --- | --- |
| 15.1 | Apply all items learned during the ag structures unit in building a small storage shed from scratch. |  |

## Benchmark 16: Basic Plumbing

### Competencies

| **#** | **Description** | **Rating** |
| --- | --- | --- |
| 16.1 | Compare the design and functions of the two separate parts of a plumbing system in writing  |  |
| 16.2 | Identify and explain plumbing tools  |  |
| 16.3 | Make a sweat soldered joint in copper pipe  |  |
| 16.4 | List the different types of fixtures  |  |
| 16.5 | Demonstrate the cutting of pipes and tubing  |  |
| 16.6 | Discuss safety rules and proper attire |  |
| 16.7 | Demonstrate the use of various tools commonly used to unplug drains |  |

## Benchmark 17: Fundamentals of Concrete

### Competencies

| **#** | **Description** | **Rating** |
| --- | --- | --- |
| 17.1 | Identify ingredients of concrete |  |
| 17.2 | Identify how to proportionally mix concrete |  |
| 17.3 | Calculate cubic yards of concrete needed in various situations |  |
| 17.4 | Calculate concrete costs |  |
| 17.5 | Identify concrete tools |  |
| 17.6 | Demonstrate how to properly prepare a site for concrete  |  |
| 17.7 | Demonstrate proper use of concrete tools |  |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

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