# Agricultural Construction Course No. 18403 Credit: 1.0

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

Pathways and CIP Codes: **Agricultural Technology and Mechanical Systems (01.0201); Diversified Agricultural Science (01.0000)**

Course Description: Course provides students with the skills and knowledge that are specifically applicable to the construction, maintenance, and repair of structures integral to the agricultural industry, including but not limited to animal enclosures, irrigation systems, and storage facilities. In these courses, students typically study design, planning, and construction knowledge and skills (such as survey, carpentry, plumbing, concrete, and electrical systems), in addition to the safe operation of tools and machines.

Special Note: The AFNR College and Career Ready Skills are to be taught throughout the course utilizing FFA and SAE programming found at the Kansas Ag Ed website. Specific activities may be found in the SAE for All Teachers Guide and at National FFA.org. The AFNR College and Career Ready Skills competencies can be found at Kansas Ag Ed.

Opportunities in Agriculture Education & FFA:Classroom and laboratory instruction integrates and/or is supplemented by experiential, project, and leadership and personal development through FFA .Students should be introduced to FFA through leadership activities and College and Career Ready Skills. Specific FFA information and activities may be found in the “National FFA Student Handbook, 16thedition”. Student activities, scoring rubrics, grading examples, and teacher lessons are all found in the “FFA Student Handbook Teachers Guide”. Additional information can be found at [www.ffa.org](http://www.ffa.org/).

Workplace Skills, Supervised Agricultural Experience and Record Keeping: Classroom and laboratory instruction integratesand/or is supplemented by experiential, project, and work based learning through SAE. Specific SAE activities that support the College and Career Ready Skills may be found in the “SAE for All Guide”. Students should be introduced to Foundational SAE’s and the AET student portfolio system. Student activities, scoring rubrics, grading examples, and teacher lessons are all found in the “SAE for All Teachers Guide”. Additional information is found in the SAE Individual Learning Guides and Teacher Editions and in the AFNR College and Career Ready Competency Profile found at *Kansas Ag* *Ed.*

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: CAREERS IN ELECTRICITY & AG CONSTRUCTION

Competencies

| # | DESCRIPTION | RATING |
| --- | --- | --- |
| 1.1 | Identify potential careers in the electrical and ag construction fields.  |  |
| 1.2 | Explore post-secondary opportunities for electrical or ag construction education.  |  |
| 1.3 | Explore steps to obtain an electrical certification. |  |
| 1.4 | Create and deliver a presentation over one career in the electrical or ag construction field.  |  |
| 1.5 | Identify and contact local businesses that require ag construction skills. |  |

Benchmark 2: SAFETY / AG CONTRUCTION LAB ORIENTATION W/ TOOL USE

Competencies

| # | DESCRIPTION | RATING |
| --- | --- | --- |
| 2.1 | Complete a shop/lab safety test with 100% accuracy. |  |
| 2.2 | Identify various tool storage locations. |  |
| 2.3 | Learn the components of the fire triangle. |  |
| 2.4 | Explain the proper use of a fire extinguisher. |  |
| 2.5 | Explain the uses of agricultural constuction hand tools. |  |
| 2.6 | Demonstrate use of hand tools properly and safely. |  |
| 2.7 | Explain the uses of power tools to perform ag construction tasks. |  |
| 2.8 | Identify and demonstrate proper methods of shop/lab clean-up. |  |
| 2.9 | Demonstrate the operation and pinch points of hand tools. |  |
| 2.10 | Detail safe practices in handling and working pressure-treated lumber. |  |

Benchmark 3: WIRING PROJECT

Competencies

| # | DESCRIPTION | RATING |
| --- | --- | --- |
| 3.1 | Apply all items learned during course in wiring the storage shed. |  |
| 3.2 | Demonstrate skills in roughing in wiring. |  |
| 3.3 | Demonstrate skills in installing single pole, three-way switch, and outlet. |  |
| 3.4 | Apply items from the National Electrical Code to the wiring project. |  |

Benchmark 4: ELECTRICAL

Competencies

| # | DESCRIPTION | RATING |
| --- | --- | --- |
| 4.1 | Identify types of electrical current. |  |
| 4.2 | Identify two different sources of electrical energy.  |  |
| 4.3 | Define electromagnetic induction.  |  |
| 4.4 | Describe how electricity is created in a generator. |  |
| 4.5 | Describe the importance of free electrons in electrical flow.  |  |
| 4.6 | Explain the difference between single and three-phase electricity. |  |

Benchmark 5: ELECTRICAL CIRCUIT THEORY

Competencies

| # | DESCRIPTION | RATING |
| --- | --- | --- |
| 5.1 | List the four components of a circuit. |  |
| 5.2 | Define voltage, amperage, wattage, resistance, conductor, insulator. |  |
| 5.3 | Give three examples of conductors and insulators. |  |
| 5.4 | Describe the effect of length and thickness of a conductor on the resistance level.  |  |
| 5.5 | Diagram series, parallel, and combination circuits. |  |
| 5.6 | Explain and calculate Ohm’s law. |  |
| 5.7 | Define power. |  |

Benchmark 6: ELECTRICAL CIRCUIT COMPONENTS

Competencies

| # | DESCRIPTION | RATING |
| --- | --- | --- |
| 6.1 | Identify wire sizes according to the numbering system. |  |
| 6.2 | Identify uses for different common wire sizes. |  |
| 6.3 | Calculate voltage drop.  |  |
| 6.4 | Identify wire insulation colors and uses. |  |
| 6.5 | List and describe devices that control circuits. |  |
| 6.6 | Identify the purpose of various switch types. |  |

Benchmark 7: ELECTRICAL CURCUIT GROUNDING

Competencies

| # | Description | RATING |
| --- | --- | --- |
| 7.1 | Describe why circuits must be grounded. |  |
| 7.2 | Define short circuit. |  |
| 7.3 | Diagram a properly grounded circuit. |  |
| 7.4 | Describe the purpose and Install of a Ground Fault Circuit Interrupter receptacle.  |  |

Benchmark 8: READING WIRING DIAGRAMS & ELECTRICAL SYMBOLS

Competencies

| # | Description | RATING |
| --- | --- | --- |
| 8.1 | Identify universal electrical symbols. |  |
| 8.2 | Determine where each electrical symbol would be used in a floor plan. |  |
| 8.3 | Use electrical symbols to create a wiring diagram on a house floor plan. |  |

Benchmark 9: ELECTRICAL CODE

Competencies

| # | Description | Rating |
| --- | --- | --- |
| 9.1 | Describe the purpose of the National Electrical Code. |  |
| 9.2 | 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. |  |

Benchmark 10: WALL & CEILING FRAMING

Competencies

| # | Description | rating |
| --- | --- | --- |
| 10.1 | Identify the main parts of a wall frame.  |  |
| 10.2 | Explain methods of forming the outside corners and partition intersections of wall frames.  |  |
| 10.3 | Demonstrate how rough openings are added into wall construction.  |  |
| 10.4 | Describe the construction and erection of wall sections and partitions.  |  |
| 10.5 | List the materials commonly used for sheathing.  |  |
| 10.6 | Describe the process of wall and ceiling frame construction. |  |
| 10.7 | Explain construction of walls using metal studs.  |  |
| 10.8 | Estimate materials required for wall frames, ceiling frames, and sheathing. |  |

Benchmark 11: ROOFING MATERIALS & METHODS

Competencies

| # | Description | Rating |
| --- | --- | --- |
| 11.1 | List the covering materials commonly used for sloping roofs.  |  |
| 11.2 | Define terms associated with roofing.  |  |
| 11.3 | Describe how to prepare the roof deck.  |  |
| 11.4 | Describe re-roofing procedures for both asphalt and wood shingles. |  |
| 11.5 | Illustrate correct nailing patterns.  |  |
| 11.6 | Select appropriate roofing materials for various slopes and conditions.  |  |
| 11.7 | Explain how various roofing products are applied.  |  |
| 11.8 | Demonstrate the proper positioning of gutters.  |  |

Benchmark 12: BUILDING FINISHING

Competencies

| # | Description | Rating |
| --- | --- | --- |
| 12.1 | List tools and equipment and demonstrate their various use. |  |
| 12.2 | Select proper materials for various painting and finishing jobs.  |  |
| 12.3 | Prepare exterior and interior surfaces for painting.  |  |
| 12.4 | Demonstrate how to properly Paint Surfaces. |  |
| 12.5 | Select proper materials for exterior building finishing. |  |

Benchmark 13: BASIC PLUMBING

Competencies

| # | Description | Rating |
| --- | --- | --- |
| 13.1 | Compare the design and functions of the two separate parts of a plumbing system. |  |
| 13.2 | Identify and explain tools used for plumbing. |  |
| 13.3 | Make a sweat soldered joint in copper pipe.  |  |
| 13.4 | List the different types of plumbing fixtures.  |  |
| 13.5 | Demonstrate the cutting of pvc, pex, and cooper. |  |

Benchmark 14: FUNDAMENTALS OF CONCRETE

Competencies

| # | Description | Rating |
| --- | --- | --- |
| 14.1 | Identify ingredients of concrete. |  |
| 14.2 | Identify how to proportionally mix concrete. |  |
| 14.3 | Calculate cubic yards of concrete needed in various situations. |  |
| 14.4 | Calculate concrete costs. |  |
| 14.5 | Identify concrete tools. |  |
| 14.6 | Demonstrate how to properly prepare a site for concrete.  |  |

Benchmark 15: STORAGE SHED CONSTRUCTION

Competencies

| # | Description | Rating |
| --- | --- | --- |
| 15.1 | Apply competencies learned in Ag Construction to build a small storage shed from scratch. |  |

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

Instructor Signature:

For more information, contact:

CTE Pathways Help Desk

(785) 296-4908

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