# Agricultural Mechanics Course No. 18401 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 tools and equipment used in the agricultural industry. While learning to apply basic industrial knowledge and skills (engine mechanics, power systems, welding, and carpentry, among others), students may explore a broad range of topics, including the operation, mechanics, and care of farm tools and machines; the construction and repair of structures integral to farm operations; a study of electricity and power principles; and safety procedures.

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: The Ag Mechanics Industry and Careers.

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Explain the importance of welding, mechanics, technical skills and construction in the local economy. |  |
| 1.2 | Identify local businesses that require agricultural mechanics skill. |  |
| 1.3 | List the causes of accidents in the agricultural mechanics workplace. |  |

## Benchmark 2: Safety / Agricultural Mechanics 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 mechanics hand tools. |  |
| 2.6 | Demonstrate use of hand tools properly and safely. |  |
| 2.7 | Explain the uses of power tools to perform agricultural mechanics 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 | Demonstrate the operation and pinch points of agricultural equipment. |  |

## Benchmark 3: Welding and Cutting Processes

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | List the proper welding safety guidelines. |  |
| 3.2 | Identify welding safety hazards. |  |
| 3.3 | Explain the physical processes of SMAW welding. |  |
| 3.4 | Identify pieces of SMAW welding equipment. |  |
| 3.5 | Differentiate between AC and DC welding. |  |
| 3.6 | Apply knowledge through SMAW welding demonstration. |  |
| 3.7 | Identify pieces of GMAW welding equipment. |  |
| 3.8 | Explain the physical processes of GMAW welding. |  |
| 3.9 | Apply knowledge through GMAW welding demonstration. |  |
| 3.10 | List the cutting safety guidelines. |  |
| 3.11 | Identify oxy-acetylene cutting. |  |
| 3.12 | Explain the physical processes of oxy-acetylene cutting. |  |
| 3.13 | Demonstrate oxy-acetylene cutting techniques. |  |
| 3.14 | Identify plasma cutting equipment. |  |
| 3.15 | Explain the processes of plasma cutting and proper the techniques involved.. |  |
| 3.16 | Demonstrate plasma cutting techniques. |  |

## Benchmark 4: SMALL ENGINE MAINTENANCE/REPAIR

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | Integrate safety practices specific to Small Engine Repair and Maintenance. |  |
| 4.2 | Operate and perform necessary equipment for assembly and disassembly. |  |
| 4.3 | Review and examine maintenance schedules and procedures. |  |
| 4.4 | Identify and reference components, parts, models, and serial numbers. |  |
| 4.5 | Check fuel, lubricant and fluid levels. |  |
| 4.6 | Identify stress points and wear indicators. |  |
| 4.7 | Observe and operate computer and electronic diagnostic equipment. |  |
| 4.8 | Select, use and calibrate measuring and testing devices like calipers and gauges. |  |
| 4.9 | Calculate measurements with both standard and metric instruments. |  |
| 4.10 | Properly use, read, and calibrate micrometers. |  |
| 4.11 | Assess equipment and systems using diagnostics. |  |
| 4.12 | Demonstrate trouble-shooting procedures. |  |
| 4.13 | Diagnose wear and condition of parts. |  |
| 4.14 | Evaluate tolerances and perform needed repairs. |  |

## Benchmark 5: ELECTRICITY IN AGRICULTURE

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 5.1 | Identify common used tools and equipment in electricity. |  |
| 5.2 | Properly demonstrate the use of electrical tools. |  |
| 5.3 | Distinguish between AC and DC currents. |  |
| 5.4 | Identify common terms used in electricity. |  |
| 5.5 | Calculate the number of watts used by a device or a motor. |  |
| 5.6 | Calculate an electrical bill for a given set of devices. |  |
| 5.7 | Draw various wiring diagrams for different circuits. |  |
| 5.8 | Demonstrate correct procedure for installing switches, receptacles, and light fixtures. |  |

## Benchmark 6: Agricultural construction

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 6.1 | Identify the main parts of a wall frame. |  |
| 6.2 | Explain the method of forming a wall frame. |  |
| 6.3 | Estimate materials required for a wall frame. |  |
| 6.4 | List covering materials commonly used for sloping roofs. |  |
| 6.5 | Define terms associated with roofing. |  |
| 6.6 | Prepare and paint surfaces. |  |
| 6.7 | Identify ingredients of concrete. |  |
| 6.8 | Identify how to proportionally mix concrete. |  |
| 6.9 | Calculate cubic yards of concrete needed in various situations. |  |
| 6.10 | Calculate concrete costs. |  |
| 6.11 | Identify concrete tools. |  |
| 6.12 | Demonstrate how to prepare and pour a concrete site. |  |
| 6.13 | Demonstrate the use of basic measuring tools. |  |
| 614 | Perform field differential surveys using a field level/laser level. |  |
| 6.15 | Record field data in a notebook and perform field calculations. |  |
| 6.16 | Demonstrate accuracy and precision in note taking. |  |
| 6.17 | Calculate material volumes from survey data, calculate elevations from survey data, determining elevations by the use of instruments. |  |
| 6.18 | Stake out a residential floor plan using standard field survey techniques. |  |

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

[pathwayshelpdesk@ksde.org](mailto:pathwayshelpdesk@ksde.org)



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