# Advanced Agricultural Mechanics Course No. 18402 Credit: 1.0

|  |  |  |  |
| --- | --- | --- | --- |
| **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: Safety / Ag Mechanics Lab Orientation w/ Tool Use

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Identify and demonstrate proper methods of shop/lab clean-up |  |
| 1.2 | Identify various tool storage locations |  |
| 1.3 | Learn the components of the fire triangle |  |
| 1.4 | Explain the proper use of a fire extinguisher |  |
| 1.5 | Explain proper shop safety color coding |  |
| 1.6 | Complete a shop/lab safety test with 100% accuracy |  |
| 1.7 | Explain the uses of agricultural mechanics hand tools. |  |
| 1.8 | Demonstrate use of hand tools properly and safely |  |
| 1.9 | Explain the uses of power tools to perform ag mech tasks |  |
| 1.10 | Demonstrate use of power tools properly and safely |  |

## Benchmark 2: Power Systems

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Identify principles and operations of internal combustion engines |  |
| 2.2 | Identify parts and components of power system in the agriculture industry |  |
| 2.3 | Troubleshoot engines, power transmission, cooling systems, fuels systems, and electrical systems |  |

## Benchmark 3: Hydraulic Systems

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Identify principles of hydraulics |  |
| 3.2 | Identify parts and components of a hydraulic system |  |
| 3.3 | Explain how the laws of physics apply to hydraulics |  |
| 3.4 | Draw a hydraulic system |  |
| 3.5 | Trouble shoot a hydraulic system |  |
| 3.6 | Demonstrate how to maintain and service a hydraulic system |  |

## Benchmark 4: Pneumatic Systems

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | Identify principles of pneumatics |  |
| 4.2 | Identify parts and components of a pneumatic system |  |
| 4.3 | Explain how the laws of physics apply to pneumatics |  |
| 4.4 | Draw a pneumatic system |  |
| 4.5 | Trouble shoot a pneumatics system |  |
| 4.6 | Demonstrate how to maintain and service a pneumatic system |  |

## Benchmark 5: Agriculture Technology

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 5.1 | Identify how electronics are used in the agriculture industry |  |
| 5.2 | Explain how precision technologies are used |  |
| 5.3 | Identify monitoring systems and demonstrate the benefits of these systems |  |
| 5.4 | Trouble shoot a remote sensing system. |  |
| 5.5 | Identify robotics components and how they benefit the agriculture industry |  |
| 5.6 | Explain the laws of using agriculture technology |  |

## Benchmark 6: Electronics & Automation in Agriculture Applications

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 6.1 | Examine and categorize electrical control components used (e.g. transistors, relays and logic controllers) |  |
| 6.2 | Differentiate between the purpose of electrical sensors and controls |  |
| 6.3 | Assess the functions of agriculture control systems using programmable logic controllers |  |
| 6.4 | Analyze and design schematic drawings for electrical control systems |  |
| 6.5 | Troubleshoot electrical control system performance problems |  |
| 6.6 | Develop and implement agriculture control systems using programmable logic controllers and/or other computer-based systems. |  |

## Benchmark 7: Geographic Information Systems (GIS) & Unmanned Aerial Vehicle (UAV) in Agriculture Applications

### Competencies

| **#** | **Description** | **RATING** |
| --- | --- | --- |
| 7.1 | Research and summarize impact of utilizing geospatial technologies in agriculture applications |  |
| 7.2 | Examine the components of precision technologies used in agriculture applications |  |
| 7.3 | Practice using GPS equipment to plot data points |  |
| 7.4 | Practice using UAV equipment in flight practice |  |
| 7.5 | Collect data and create maps utilizing geospatial technologies |  |
| 7.6 | Analyze and interpret trends in data collected utilizing geospatial technologies |  |
| 7.7 | Install, maintain and service instrumentation equipment used for precision technologies used in agriculture systems |  |

## Benchmark 8: Plumbing in Agriculture

### Competencies

| **#** | **Description** | **RATING** |
| --- | --- | --- |
| 8.1 | Identify common used tools and equipment in plumbing |  |
| 8.2 | Properly demonstrate the use of simple plumbing tools |  |
| 8.3 | Identify common terms used in plumbing |  |
| 8.4 | Understand the basic fundamentals in plumbing |  |
| 8.5 | Calculate the amount of pressure in differing lines and systems |  |
| 8.6 | Calculate amount of flow in differing lines/systems |  |
| 8.7 | Calculate total amount of resistance in a line or system |  |
| 8.8 | Draw various plumbing diagrams for different systems |  |
| 8.9 | Demonstrate proper steps in attaching glue/no-glue joints |  |
| 8.10 | Demonstrate proper layout procedures before fitting begins |  |

## Benchmark 9: Layout and Setup of Projects

### Competencies

| **#** | **Description** | **Rating** |
| --- | --- | --- |
| 9.1 | Read blueprints and follow detail plans for project construction |  |
| 9.2 | Make and read a working drawing |  |
| 9.3 | Estimate materials needed for a project |  |
| 9.4 | Calculate project costs |  |
| 9.5 | Prepare a bill of materials |  |
| 9.6 | Identify types of metal |  |
| 9.7 | Construct group projects |  |
| 9.8 | Construct individual projects |  |
| 9.9 | Make a project drawing on the computer |  |

## Benchmark 10: Project Construction

### Competencies

| **#** | **Description** | **rating** |
| --- | --- | --- |
| 10.1 | Explain procedures to design a metal or wood project |  |
| 10.2 | Use correct procedures to design a metal or wood project |  |
| 10.3 | Apply proper procedures to construct a metal or wood project |  |
| 10.4 | Project: |  |

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)



900 S.W. Jackson Street, Suite 102

Topeka, Kansas 66612-1212

[https://www.ksde.org](https://www.ksde.org/)

The Kansas State Department of Education does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities and provides equal access to any group officially affiliated with the Boy Scouts of America and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: KSDE General Counsel, Office of General Counsel, KSDE, Landon State Office Building, 900 S.W. Jackson, Suite 102, Topeka, KS 66612, (785) 296-3201.