# Advanced Agricultural Mechanics Course No. 18402 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: 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



900 S.W. Jackson Street, Suite 102

Topeka, Kansas 66612-1212

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