# Advanced Agricultural Power Course No. 18411 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: 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 ag mechanics skills |  |
| 1.3 | List the causes of accidents in the Ag Mechanics workplace |  |

## Benchmark 2: Safety / Ag Mechanics Lab Orientation w/ Tool Use

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Identify and demonstrate proper methods of shop/lab clean-up |  |
| 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 proper shop safety color coding |  |
| 2.6 | Complete a shop/lab safety test with 100% accuracy |  |
| 2.7 | Explain the uses of agricultural mechanics hand tools. |  |
| 2.8 | Demonstrate use of hand tools properly and safely |  |
| 2.9 | Explain the uses of power tools to perform ag mechanics tasks |  |

## Benchmark 3: Small Engine Maintenance/Repair

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Integrate safety practices specific to Small Engine Repair and Maintenance |  |
| 3.2 | Operate and perform necessary equipment for assembly and disassembly. |  |
| 3.3 | Review and examine maintenance schedules and procedures. |  |
| 3.4 | Identify and reference components, parts, models, and serial numbers. |  |
| 3.5 | Check fuel, lubricant and fluid levels. |  |
| 3.6 | Identify stress points and wear indicators. |  |
| 3..7 | Observe and operate computer and electronic diagnostic equipment. |  |
| 3.8 | Select, use and calibrate measuring and testing devices like calipers and gauges |  |
| 3.9 | Calculate measurements with both standard and metric instruments. |  |
| 3.10 | Properly use, read, and calibrate micrometers. |  |
| 3.11 | Assess equipment and systems using diagnostics |  |
| 3.12 | Demonstrate trouble-shooting procedures. |  |
| 3.13 | Diagnose wear and condition of parts |  |
| 3.14 | Evaluate tolerances and perform needed repairs. |  |

## Benchmark 4: Tractor and Large Engine Power

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | Describe engine theory of operation systems. |  |
| 4.2 | Differentiate between 2 and 4 cycle engines |  |
| 4.3 | Identify basic engine parts |  |
| 4.4 | Describe the basic operation of engine systems, including: lubrication; cooling; governing; and fuel. |  |
| 4.5 | Identify components of the diesel fuel system |  |
| 4.6 | Describe the operation of the injection system |  |
| 4.7 | Describe the function of the powertrain |  |
| 4.8 | Interpret torque, horsepower, and other units of power measurement |  |
| 4.9 | Perform gear and torques calculations |  |

## Benchmark 5: Hydraulic Power

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 5.1 | Explain basic hydraulic theory & Boyles Law |  |
| 5.2 | Describe open and closed systems |  |
| 5.3 | Identify hydraulic pump types |  |
| 5.4 | Compare types of pumps for specific applications |  |
| 5.5 | Select hydraulic valves for specific purposes |  |
| 5.6 | Identify types of hydraulic cylinders |  |
| 5.7 | Perform hydraulic calculations related to speed, volume, force, capacities |  |
| 5.8 | Identify types of hydraulic motors |  |
| 5.9 | Identify components of hydraulic systems |  |

## Benchmark 6: Electricity in Agriculture

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 6.1 | Identify common used tools and equipment in electricity |  |
| 6.2 | Properly demonstrate the use of electrical tools |  |
| 6.3 | Distinguish between AC and DC currents |  |
| 6.4 | Identify common terms used in electricity |  |
| 6.5 | Calculate the number of watts used by a device or a motor. |  |
| 6.6 | Calculate an electrical bill for a given set of devices |  |
| 6.7 | Draw various wiring diagrams for different circuits |  |
| 6.8 | Demonstrate correct procedure for installing switches, receptacles, and light fixtures |  |
| 6.9 | Read schematics and sketch wiring control circuits |  |
| 6.10 | Troubleshoot circuits using testing equipment |  |
| 6.11 | Demonstrate the use of a multi-meter to measure various electrical loads |  |

## Benchmark 7: Electrical Power

### Competencies

| **#** | **Description** | **RATING** |
| --- | --- | --- |
| 7.1 | Explain the theory of electrical motor operation |  |
| 7.2 | Identify electrical motors and parts |  |
| 7.3 | Select motor based on application |  |
| 7.4 | Interpret motor nameplate data |  |
| 7.5 | Interpret motor wiring connection diagrams |  |
| 7.6 | Connect dual voltage motor to power source |  |
| 7.7 | Change the direction of motor rotation |  |
| 7.8 | Service and lubricate an electric motor |  |
| 7.9 | Determine and calculate horsepower, torque, and load requirements of a motor |  |

## Benchmark 8: Electrical Controls and Sensing Devices

### Competencies

| **#** | **Description** | **RATING** |
| --- | --- | --- |
| 8.1 | Interpret wiring diagrams |  |
| 8.2 | Identify, explain and controls, including: thermostats; humidistats, photoelectric; magnetic relays; programmable controllers; time delay equipment; pressure switches; and limit switches. |  |
| 8.3 | Install low-voltage control equipment |  |
| 8.4 | Connect motor controls |  |
| 8.5 | Install low-voltage motor-control system |  |

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

Instructor Signature:

For more information, contact:

CTE Pathways Help Desk

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



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