

Fundamental Ag Mechanics

18401

Rationale Statement:

This course is offered to help students build basic knowledge and skills in the area of Agricultural Mechanics. More substantial knowledge on the individual topics comes in advanced courses such as Ag Power Technology, Ag Metal Fabrication, Fundamental Ag Structures and Advanced Ag Structures. South Dakota demand in agricultural mechanics is increasing with a shortage of certified mechanics. Classroom and laboratory content may be enhanced by utilizing appropriate equipment and technology. Algebra, geometry, English and human relations skills will be reinforced in the course. Work-based learning strategies appropriate for this course are school-based enterprises and field trips. Opportunities for application of clinical and leadership skills are provided by participation in FFA activities, conferences and skills competition such as the Ag Mechanics Career Development Event or related proficiency award areas. Each student will be expected to complete a Supervised Agricultural Experience program/Internship.

Suggested grade level: 10th – 12th

Topics covered:

- Safety
- Maintenance of mechanical equipment and agricultural technology
- Servicing and Testing mechanical systems
- Internal combustion engines
- Hydraulics
- Project planning
- Metal fabrication
- Electricity

Indicator #1: Apply safety practices in mechanical applications.

Bloom's Taxonomy Level	Standard and Examples
Understanding	<p>FAM 1.1 Explain the safe operation and servicing of machinery and equipment.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Describe the function(s) of machine controls and instrumentation. • Perform appropriate start-up and shut-down procedures. • Select the proper machines(s) for a specific task(s). • Perform pre-operation inspection.
Applying	<p>FAM 1.2 Use construction/fabrication tools to demonstrate safe operation and proper skills.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Demonstrate proper use of measurement and layout tools on scrap materials and equipment. • Choose the correct tool(s) and use it properly for service, construction or fabrication. • Assess a peer's use of hand and power tools for safe and proper use.

Indicator #2: Maintain mechanical equipment, power and agricultural technology.

Bloom's Taxonomy Level	Standard and Examples
Applying	<p>FAM 2.1 Perform service routines to maintain machinery and equipment.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Lubricate machinery and equipment with proper lubricants. • Check for the presence of and proper function of safety systems and hardware. • Perform machine adjustments (e.g., belts, drive chains, sprockets, hoses, lines, nozzles, etc.). • Demonstrate disposal and storage procedures. • Service filtration systems. • Design a preventive maintenance schedule.

Evaluating	<p>FAM 2.2 Troubleshoot problems in mechanical systems.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Assess parts for replacement. • Select, calibrate and use measuring and testing devices. • Defend repair plans. • Select the correct tools or materials for the job at hand.
Applying	<p>FAM 2.3 Repair internal combustion engines.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Write a description of the operation of internal combustion engines. • Illustrate engine systems and components. • Troubleshoot problems in a small gas engine. • Use technical manuals in engine repair.
Applying	<p>FAM 2.4 Repair hydraulic and pneumatic systems.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Illustrate the operations of hydraulic and pneumatic systems. • Operate hydraulic and pneumatic systems. • Apply hydrostatic and hydrodynamic principles in hydraulics and pneumatics, including Archimede’s principle and Pascal’s law. • Write a description of the major components of hydraulic and pneumatic systems, including their use.
<p>Indicator #3: Demonstrate basic skills in project planning and metal fabrication.</p>	
<p>Bloom’s Taxonomy Level</p>	<p>Standard and Examples</p>
Applying	<p>FAM 3.1 Create sketches of agricultural equipment.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Interpret symbols used in plans and sketches. • Utilize drawing techniques to develop a simple sketch. • Use current technology to develop sketches of a metal or wood project. • Use scale measurement and dimension to develop simple plans and sketches.

Applying	<p>FAM 3.2 Employ ag metal fabrication principles.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Use protective clothing. • Perform mechanical calculations with rulers, fractions, surface areas, etc. • Choose appropriate metals for different applications. • Bend, cut, shape, file, grind metal. • Set up oxy fuel equipment. • Cut metal with oxy fuel. • Identify welders and controls. • Prepare metal for welding. • Weld flat, horizontal, vertical, overhead positions.
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Indicator #4: Apply electrical principles in agricultural applications.

Bloom's Taxonomy Level	Standard and Examples
Understanding	<p>FAM 4.1 Recognize the components and functions of electrical systems.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Observe safety practices while working with electrical systems. • Paraphrase Ohm's law. • Use volt and amp meters and continuity testers to demonstrate electricity principles. • Identify classes of wire. • Select the proper wire, wire nuts, junction boxes, switches, outlets, etc. for a circuit with a specific purpose. • Recognize common electrical symbols. • Interpret wire code regulations. • Describe the importance of and techniques for grounding. • Determine circuit protection requirements.
Applying	<p>FAM 4.2 Demonstrate fundamental principles of electricity.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Wire a circuit with a light, controlled by a switch. • Troubleshoot an electrical system to identify performance problems. • Interpret schematic drawings for an electrical system.