PROGRAM CONCENTRATION: Agriculture
CAREER PATHWAY: Agricultural Mechanics
COURSE TITLE: Agricultural Mechanics II

Course Description: The goal of this laboratory course is to offer students intermediate level experiences in selected major areas of agricultural mechanics technology which may include small engine maintenance and repair, metal fabrication, concrete construction, building construction, plumbing, electrical wiring, soil and water conservation, and maintenance of agricultural machinery, equipment and tractors. Learning activities include information, skill development, and problem solving.

AG-AMII-1. Students will service, maintain, repair, and operate small air-cooled engines.

a. Explain the operating theories of a small engine.
b. Interpret service and parts manuals for small engines.
c. Describe the importance of servicing small engines to manufacturer’s recommendations.
d. Set up a maintenance calendar using the manufacturer’s service recommendations.
e. Perform basic service recommendations on a small engine.
f. Identify tools for engine repair.
g. Disassemble and reassemble a small engine.
h. Troubleshoot and repair basic small engine problems.
i. Identify operating instructions and safety procedures for operating small engines.
j. Demonstrate proper operation of a small engine.

Academic Standards:
ELA9RC2 The student participates in discussions related to curricular learning in all subject areas.

ELA12LSV1 The student participates in student-to-teacher, student-to-student, and group verbal interactions.

ELA9RL5 The student understands and acquires new vocabulary and uses it correctly in reading and writing.

ELA10W3 The student uses research and technology to support writing.

MM1A3 The student solves simple equations.

MA1P1 The student solves problems (using appropriate technology).

MA1P3 The student communicates mathematically.
SCSh2 The student uses standard safety practices for all classroom laboratory and field investigations.

SCSh3 The student identifies and investigates problems scientifically.

SCSh4 The student uses tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

SP1 The student analyzes the relationships between force, mass, gravity, and the motion of objects.

SPS5 The student compares and contrasts the phases of matter as they relate to atomic and molecular motion.

SPS7 The student relates transformations and flow of energy within a system.

AG-AMII -2. Students will demonstrate skills in basic electrical wiring.

   a. Describe the theory of electricity.
   b. Define electrical terms.
   c. Identify electrical symbols used in diagrams and floor plans.
   d. Select service entrance equipment for different jobs.
   e. Explain the theory of operation for branch circuits.
   f. Identify types of circuits and outlets.
   g. Plan electrical circuits.
   h. Select service entrance equipment for a specific job.
   i. Select materials to wire a branch circuit.
   j. Select appropriate grounding materials for a specific wiring system.
   k. Draw a wiring diagram using appropriate symbols according to National Electrical Code.
   l. Install service entrance equipment.
   m. Install branch circuits.
   n. Install grounding materials.
   o. Determine electrical testing equipment for specific applications.
   p. Use electrical testing equipment to determine the working condition of the equipment.

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AG-AMII-3. Students will implement a tractor maintenance and operation program.

a. Explain a tractor maintenance program.
b. Develop a detailed tractor maintenance calendar using the manufacturer’s service recommendations.
c. Interpret service manual for tractor maintenance.
d. Interpret a service manual for a tractor.
e. Perform basic service and maintenance recommendations on a tractor.
f. Identify operating instructions and safety procedures for operating a tractor.
g. Operate the tractor and/or lawn equipment safely as recommended by the manufacturer.

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**AG-AMII-4.** Students will plan, design, draw, construct, and preserve a woodworking project.

a. Create woodworking project plans using simple drawing techniques.
b. State the use and format of a bill of materials.
c. Calculate the bill of materials.
d. Select and plan projects that develop woodworking skills with hand tools.
e. Handle and use woodworking tools without causing injury.
f. Demonstrate proper techniques for using hand tools to the standards set by the instructor.
g. Select and use wood filler for a woodworking project.
h. Prepare wood projects for finishing by hand sanding with appropriate materials.
i. Select and use paint, varnish, and stains on woodworking projects.

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**AG-AMII-5. Students will describe basic stationary power woodworking machines.**

- Perform basic procedures for using stationary power woodworking machines.
- Describe major parts of specified machines.
- Analyze the main uses and safety precautions for each woodworking machine.
- Demonstrate the proper operation of basic power woodworking equipment.

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AG-AMII-6. Students will cut metals, join metals, condition tools, and utilize materials used in metal fabrication

   a. Identify metal fabrication equipment.
   b. Describe adjustments and settings for metal fabrication equipment.
   c. Adjust metal fabrication equipment for optimum performance.
   d. Use metal working equipment for cutting as described by the manufacturer.
   e. Use metal working equipment for welding as described by the manufacturer.

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AG-AMII-7. Students will demonstrate welding and cutting with Oxy-Acetylene.

   a. Perform the safety practices that should be observed in performing Oxy-Acetylene welding and cutting according to industry standards.
   b. Perform welding and cutting operations to standards set by the industry.

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AG-AMII-8. Students will plan, design, draw, construct, and preserve a metal working project.

a. Create metal working project plans using simple drawing techniques.
b. State the use and format of a bill of materials.
c. Calculate the bill of materials.
d. Select and plan projects that develop metal working skills with hand tools.
e. Handle and use metal working tools without causing injury.
f. Demonstrate proper techniques for using hand tools to the standards set by the instructor.
g. Prepare metal projects for finishing by hand sanding with appropriate materials.
h. Explain how to select and use paint on metal projects.
i. Prepare metal projects for finishing by selecting and using appropriate materials.

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AG-AMII-9. Students will become oriented to the comprehensive program of agricultural education, learn to work safely in the agriculture lab and work sites, demonstrate selected competencies in leadership through the FFA and agricultural industry organizations, and develop plans for a Supervised Agricultural Experience Program (SAEP).

a. Explain the role of the Agriculture Education program and the FFA in personal development.
b. Demonstrate knowledge learned through a Supervised Agricultural Experience Program (SAEP).
c. Develop leadership and personal development skills through participation in the FFA.
d. Explore career opportunities in Agriscience through the FFA and Agriculture Education Program.
e. Explore the professional agricultural organizations associated with the course content.
f. Explore the history and background of the FFA.

Reading Across the Curriculum

Reading Standard Comment
After the elementary years, students engage in reading for learning. This process sweeps across all disciplinary domains, extending even to the area of personal learning. Students encounter a variety of informational as well as fictional texts, and they
experience text in all genres and modes of discourse. In the study of various disciplines of learning (language arts, mathematics, science, social studies), students must learn through reading the communities of discourse of each of those disciplines. Each subject has its own specific vocabulary, and for students to excel in all subjects, they must learn the specific vocabulary of those subject areas in context.

Beginning with the middle grades years, students begin to self-select reading materials based on personal interests established through classroom learning. Students become curious about science, mathematics, history, and literature as they form contexts for those subjects related to their personal and classroom experiences. As students explore academic areas through reading, they develop favorite subjects and become confident in their verbal discourse about those subjects.

Reading across curriculum content develops both academic and personal interests in students. As students read, they develop both content and contextual vocabulary. They also build good habits for reading, researching, and learning. The Reading Across the Curriculum standard focuses on the academic and personal skills students acquire as they read in all areas of learning.

**CTAE-RC-1 Students will enhance reading in all curriculum areas by:**

**Reading in All Curriculum Areas**
- Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas.
- Read both informational and fictional texts in a variety of genres and modes of discourse.
- Read technical texts related to various subject areas.

**Discussing Books**
- Discuss messages and themes from books in all subject areas.
- Respond to a variety of texts in multiple modes of discourse.
- Relate messages and themes from one subject area to messages and themes in another area.
- Evaluate the merit of texts in every subject discipline.
- Examine author’s purpose in writing.
- Recognize the features of disciplinary texts.

**Building Vocabulary Knowledge**
- Demonstrate an understanding of contextual vocabulary in various subjects.
- Use content vocabulary in writing and speaking.
- Explore understanding of new words found in subject area texts.

**Establishing Context**
- Explore life experiences related to subject area content.
- Discuss in both writing and speaking how certain words are subject area related.
- Determine strategies for finding content and contextual meaning for unknown words.
CTAE Foundation Skills

The Foundation Skills for Career, Technical and Agricultural Education (CTAE) are critical competencies that students pursuing any career pathway should exhibit to be successful. As core standards for all career pathways in all program concentrations, these skills link career, technical and agricultural education to the state’s academic performance standards.

The CTAE Foundation Skills are aligned to the foundation of the U.S. Department of Education’s 16 Career Clusters. Endorsed by the National Career Technical Education Foundation (NCTEF) and the National Association of State Directors of Career Technical Education Consortium (NASDCTEc), the foundation skills were developed from an analysis of all pathways in the sixteen occupational areas. These standards were identified and validated by a national advisory group of employers, secondary and postsecondary educators, labor associations, and other stakeholders. The Knowledge and Skills provide learners a broad foundation for managing lifelong learning and career transitions in a rapidly changing economy.

CTAE-FS-1 Technical Skills: Learners achieve technical content skills necessary to pursue the full range of careers for all pathways in the program concentration.

CTAE-FS-2 Academic Foundations: Learners achieve state academic standards at or above grade level.

CTAE-FS-3 Communications: Learners use various communication skills in expressing and interpreting information.

CTAE-FS-4 Problem Solving and Critical Thinking: Learners define and solve problems, and use problem-solving and improvement methods and tools.

CTAE-FS-5 Information Technology Applications: Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

CTAE-FS-6 Systems: Learners understand a variety of organizational structures and functions.

CTAE-FS-7 Safety, Health and Environment: Learners employ safety, health and environmental management systems in corporations and comprehend their importance to organizational performance and regulatory compliance.

CTAE-FS-8 Leadership and Teamwork: Learners apply leadership and
teamwork skills in collaborating with others to accomplish organizational goals and objectives.

**CTAE-FS-9 Ethics and Legal Responsibilities**: Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

**CTAE-FS-10 Career Development**: Learners plan and manage academic-career plans and employment relations.

**CTAE-FS-11 Entrepreneurship**: Learners demonstrate understanding of concepts, processes, and behaviors associated with successful entrepreneurial performance.