Agriculture Power, Structure and Technology is a two semester, lab intensive course in which students develop an understanding of basic principles of selection, operation, maintenance, and management of agricultural equipment in concert with the utilization of technology. Topics covered include: safety, electricity, plumbing, concrete, carpentry, metal technology, engines, emerging technologies, leadership development, supervised agricultural experience, and career opportunities in the area of agriculture power, structure, and technology.

Course Specifications
- DOE Code: 5088
- Recommended Grade Level: Grade 9-12
- Recommended Prerequisites: Introduction to Agriculture, Food, and Natural Resources
- Credits: 1-3 credit(s) per semester, maximum of 6 credits
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas

Application of Content and Multiple Hour Offerings
Intensive laboratory applications are a component of this course and may be either school based or work based or a combination of the two. Work-based learning experiences should be in a closely related industry setting. Instructors shall have a standards-based training plan for students participating in work-based learning experiences. When a course is offered for multiple hours per semester, the amount of laboratory application or work-based learning needs to be increased proportionally.

Career and Technical Student Organizations (CTSOs)
Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students should be encouraged to participate in FFA, the CTSO for this area.

Content Standards
Domain - Classroom and Tool Safety
Core Standard 1 Students analyze and implement safe work practices which apply to agricultural mechanics.

Standards
- APST-1.1 Explain the importance of safety in agricultural mechanics
- APST-1.2 Identify and differentiate between safe and unsafe work practices
- APST-1.3 Describe the methods utilized to implement safe work practices
- APST-1.4 Identify and explain the purpose of signals and symbols in agricultural safety
- APST-1.5 Explain the importance and function of an operator's manual
- APST-1.6 Evaluate the importance of shop safety
Identify and explain the role that various agencies play in regulating shop safety

Identify and demonstrate the proper use of safety equipment which should be worn in the agricultural shop

Locate and demonstrate the proper uses of the first aid and emergency equipment found in an agricultural shop

Develop proper safety skills to use for hand and power tools

Core Standard 2 Determine which hand tool, power tool, and measuring and marking devices is most appropriate for a job.

Standards

APST-2.1 Identify the hand tools utilized in agricultural power, structure, and technology
APST-2.2 Display the proper techniques to employ when utilizing hand tools
APST-2.3 Identify the power tools utilized in agricultural mechanics
APST-2.4 Show the proper techniques to employ when utilizing power tools
APST-2.5 Identify and display the correct use of measuring and marking devices
APST-2.6 Show the correct procedures to follow when preparing to grind and sharpen equipment
APST-2.7 Identify the correct methods for and display the proper techniques to employ when reconditioning hand tools such as hammers, twist drills, chisels, punches, and screwdrivers
APST-2.8 Demonstrate a knowledge and understanding of metric to standard measurement conversions

Domain – Electricity

Core Standard 3 Students analyze and apply the procedures used in basic electric wiring.

Standards

APST-3.1 Define basic electrical terminology and Identify and explain the basic principles of electricity
APST-3.2 Recognize and explain schematics and construct wiring circuits
APST-3.3 Demonstrate safe wiring practices and basic wiring skills
APST-3.4 Show the methods used to make proper splices and connections
APST-3.5 Explain and demonstrate the methods used to measure electrical circuits for voltage, amperage, resistance, and wattage
APST-3.6 Solve multi-step problems to install electrical circuits, switching devices, and appliances
APST-3.7 Justify the need to install ground-fault circuit interrupters
APST-3.8 Differentiate between amps, ohms, volts, and watts
APST-3.9 Explore and utilize electric motors and controls

Domain - Plumbing

Core Standard 4 Students apply concepts used in basic plumbing.

Standards

APST-4.1 Define basic plumbing terminology
APST-4.2 Display the proper procedures utilized to connect flare and compression fittings
APST-4.3 Perform the proper procedures to utilize when soldering copper fittings

Agriculture Power, Structure, and Technology, 7-8-14, page 2 of 5
APST-4.4 Demonstrate the proper procedures for cutting, fitting, and assembling pipe

APST-4.5 Examine and define different types of irrigation systems

APST-4.6 Explain the scientific and mechanical ways in which hydraulic and pneumatic systems operate

**Domain - Concrete**

**Core Standard 5** Students apply and adapt proper application of basic concrete principles.

**Standards**

APST-5.1 Define basic concrete terminology and develop a list of necessary materials to complete the task

APST-5.2 Demonstrate the proper methods used to construct forms and prepare a site for concrete/masonry construction

APST-5.3 Demonstrate the proper methods used to lay out a building foundation

APST-5.4 Calculate the cost and amounts of materials needed to formulate a concrete or mortar mix

APST-5.5 Establish the necessary techniques for conducting and evaluating a slump test

APST-5.6 Demonstrate the proper methods for use and maintenance of concrete and masonry finishing tools and equipment

APST-5.7 Explain the necessity for and the proper procedures to use when placing concrete or masonry reinforcement

APST-5.8 Demonstrate all of the necessary steps to place, consolidate, finish, and cure concrete

APST-5.9 Demonstrate the proper methods for use and maintenance of concrete and masonry finishing tools and equipment

**Domain - Carpentry**

**Core Standard 6** Students apply concepts in basic carpentry skills.

**Standards**

APST-6.1 Define basic carpentry terminology

APST-6.2 Identify and explain the uses for the various building materials and show the proper methods for planning a cost effective construction project

APST-6.3 Identify, select, and apply construction fasteners

APST-6.4 Demonstrate the proper methods for laying out, cutting, and constructing buildings or building components

APST-6.5 Demonstrate the proper methods for construction of various forms of trusses from different building materials

APST-6.6 Demonstrate the proper methods for the installation of various roofing materials

**Domain - Metal Technology**

**Core Standard 7** Students establish metal technology skills.

**Standards**

APST-7.1 Define basic metal terminology

APST-7.2 Correctly identify various metals and how to correctly cut, file, shape, and drill metal

APST-7.3 Explain and demonstrate the proper procedures for cutting threads with taps and dies
Explain and show the uses for arc welding equipment, proper operation and preparation of metal to be welded

Demonstrate proficiency in the proper methods utilized to weld basic joints in all positions

Explain and show the uses for oxy-fuel equipment, proper operation and preparation specific to welding or cutting operations

Demonstrate how to prepare and finish metal

Explain and demonstrate the different uses for a GMAW

Demonstrate how to read and draw welding symbols

Domain - Engines

Core Standard 8 Students analyze operation, maintenance, and repair of engines.

Standards

APST-8.1 Identify and explain the function and maintenance of integral engine components

APST-8.2 Compare and contrast a 4 stroke-cycle, 2 stroke-cycle, and diesel engine

APST-8.3 Explain and demonstrate the proper tools methods for overhauling ICB “internal combustion” engines

APST-8.4 Explain and demonstrate proficiency in the use of measuring tools and test instrument

APST-8.5 Select and use lubricants by proper classification

Domain - Emerging Technologies

Core Standard 9 Apply concepts in emerging technologies related to agriculture power, structure and technology.

Standards

APST-9.1 Evaluate, apply, and discuss emerging technologies

APST-9.2 Identify the importance and uses of computer-based systems in agriculture, food and natural resources

APST-9.3 Use common computer-based programs to analyze agricultural data

APST-9.4 Identify uses, components and setup of precision technology in agriculture, food and natural resources

Domain - Careers

Core Standard 10 Students examine the scope of career opportunities in and the importance of agriculture to the economy.

Standards

APST-10.1 Define and explore power, structure, and technology in agriculture and agribusiness and their role in the economy

APST-10.2 Evaluate and explore the power, structure, and technology career opportunities in agriculture

APST-10.3 Identify how key organizational structures and processes affect organizational performance and the quality of products and services

APST-10.4 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society

Domain - Leadership

Core Standard 11 Students validate the necessity of leadership skills development in conjunction with
participation in The National FFA Organization (FFA) as a critical component to a well rounded agricultural education.

**Standards**

APST-11.1   Demonstrate communication skills such as writing, public speaking, and listening while refining oral, written, and verbal skills

APST-11.2   Explain the role of the FFA in the development of leadership, education, employability, communications and human relations skills

APST-11.3   Examine roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment

APST-11.4   Acquire the skills necessary to positively influence others

APST-11.5   Develop a skill set to enhance the positive evolution of the whole person

**Domain 12: Supervised Agriculture Experience**

**Core Standard** Students validate the necessity of a Supervised Agricultural Experience (SAE) program as a critical component to a well rounded agricultural education.

**Standards**

APST-12.1   Explain the nature of and become familiar with those terms related to an SAE program

APST-12.2   Explore the numerous possibilities for an SAE program which a student might develop

APST-12.3   Develop an individual SAE program and implement record keeping skills