

AGRICULTURE POWER, STRUCTURE, AND TECHNOLOGY

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

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| 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 |

- APST-1.7 Identify and explain the role that various agencies play in regulating shop safety
- APST-1.8 Identify and demonstrate the proper use of safety equipment which should be worn in the agricultural shop
- APST-1.9 Locate and demonstrate the proper uses of the first aid and emergency equipment found in an agricultural shop
- APST-1.10 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

- 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

- APST-7.4 Explain and show the uses for arc welding equipment, proper operation and preparation of metal to be welded
- APST-7.5 Demonstrate proficiency in the proper methods utilized to weld basic joints in all positions
- APST-7.6 Explain and show the uses for oxy-fuel equipment, proper operation and preparation specific to welding or cutting operations
- APST-7.7 Demonstrate how to prepare and finish metal
- APST-7.8 Explain and demonstrate the different uses for a GMAW
- APST-7.9 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