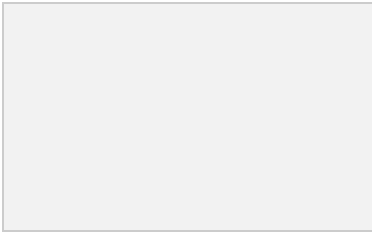


Cover Sheet



Dover Area School District Curriculum Cover Sheet

CIP Code: 01.0201

CIP Title: Agricultural Mechanization

Planned Hours: 720

CIP Description:

Agricultural Mechanization prepares individuals in a general way to sell, select, and service agricultural or agribusiness technical equipment and facilities, including computers, specialized software, power units, machinery, equipment, structures, and utilities. This program includes instruction in agricultural power units, the planning and selection of materials for the construction of agricultural facilities, safe mechanical practices associated with water conservation, erosion control, and data processing systems.

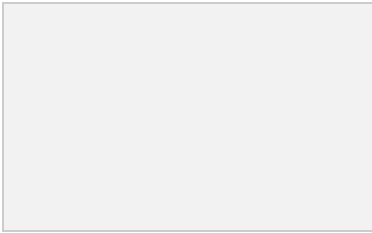
Component Courses:

874 - Agricultural Business & Marketing (120 hours)

This course includes an extensive study of agricultural and small-business financial principles, including marketing, agricultural business structure, advanced recordkeeping, computer-based business analysis, and basic taxes. Career development, including workplace skills, will be discussed. Students completing the Agriculture General, Applied Horticulture, and Agriculture Mechanization Programs would benefit from this course.

879 - Agricultural Mechanics I (120 hours)

Students will learn how to safely operate hand and power tools used for working with wood and metal as they produce several required agriculture shop projects. This is a basic entry-level course for Ag Mechanics. Students will receive preparation to earn their 10-hour or 30-hour U.S. Department of Labor OSHA completion card.



Dover Area School District

Curriculum Cover Sheet

880 - Welding Technology (120 hours)

Prerequisite: Successful Completion or Concurrent Scheduling of Agricultural Mechanics I

This course will focus on arc welding, gas welding, soldering, and MIG welding. Students will complete a set of required welding skills and be evaluated on progress and mastery. Several small metal projects will be required. Safety will be emphasized.

881 - Ag Engine Care (120 hours)

Prerequisite: Successful Completion or Concurrent Scheduling of Agricultural Mechanics I

This course focuses on small gas engine repair and maintenance. Students will complete the disassembly and reassembly of a 4-cycle engine. Theories of operation will be emphasized. Repair manuals, including internet sites, will be used for engine specifications. Proper tool selection and use will be utilized. Troubleshooting engines will be a major focus; some regular car care will be included.

886 - Advanced Agricultural Mechanics (120 hours)

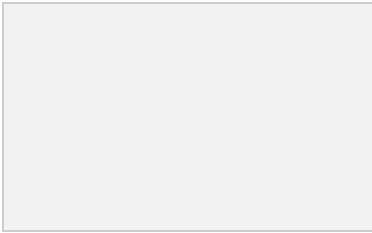
Prerequisite: Successful Completion of Agricultural Mechanics I, Welding Technology, and commitment to complete the Ag Mechanics program.

This course is the final Agricultural Mechanics course that incorporates previously learned skills in welding, building construction, electrical wiring, and small gas engines. Students will complete larger projects of their choice, either individually or in small groups. This course is designed for students who are Ag Mechanics NOCTI completers to hone their skills.

888 - Construction (120 hours)

Prerequisite: Successful Completion or Concurrent Scheduling of Agricultural Mechanics I

In this course, students will learn about building layout, planning, and framing, along with practical theories of electricity, with emphasis on proper wiring techniques. Students will complete a series of labs focused on circuits commonly found in the home, including receptacles and switches. Students will learn to read and produce building plans. Shop work will include a required project and or a major agriculture building construction project. A masonry project will be included. Students will learn basic land surveying.



Dover Area School District

Curriculum Cover Sheet

890 - Supervised Agricultural Experience (120 hours)

REQUIRED: TEACHER MUST APPROVE

In this course, agricultural students will receive detailed help with the initial development and implementation of their Supervised Agricultural Experience project or SAE. Coursework will include an emphasis on project development and record-keeping skills. Students will use the Agriculture Experience Tracker (AET), an online program, to record data about the time and money they devote to their project.

891 - Agricultural Work Experience (120 hours) (Fall)

892 - Agricultural Work Experience (120 hours) (Fall)

893 - Agricultural Work Experience (120 hours) (Spring)

894 - Agricultural Work Experience (120 hours) (Spring)

MUST ALSO BE ENROLLED IN 874 (AG BUSINESS & MARKETING)

Seniors who meet the prescribed requirements are given the opportunity to obtain on-the-job vocational work experience. All students who elect this course must be on the path to being an AG General Program completer. Students will be permitted to leave school one or two periods per day in order to report to their job.

Agricultural Work Experience is designed to provide senior students with an in-depth “real world” career experience. This program, approved for credit by the Pennsylvania Department of Education, connects school-based classroom/laboratory instruction with career and technical knowledge learned on a work site. It provides students with on-the-job training that is directly related to their future career objectives. The Capstone Seminar experience is often viewed as the completing element of secondary career and technical educational experience. It provides a valuable connection when the student graduates and continues with post-secondary education or enters directly into the workforce. The paid employment shall be within careers related to students’ Ag-General Program of Study and vocational plan, or a combination thereof. This class is only for the CTE Ag-General program of study completers. Students must be accepted to become a program of study completer to schedule this class. Students must be at least 16 years of age and must accept full responsibility for transportation to/from the workplace. The district and its agents are not liable for transportation and any related injury or loss.

Pacing Guide

PACING GUIDE

874 - Agricultural Business & Marketing	Associated Tasks	120 Hours
Business Start-Up	101, 201, 202, 204, 205, 208, 211	15 hours
Managing Finances	202, 204, 205, 207, 1201	25 hours
Managing Risk	202, 203, 204, 205, 207	30 hours
Business Planning	202, 204, 205, 209	20 hours
Marketing	202, 204, 205, 209	20 hours
NOCTI Preparation and Completion	All Listed Above	10 hours

879 - Agricultural Mechanics I	Associated Tasks	120 Hours
Shop Safety & Orientation	402, 403, 404, 409	12 hours
Measurement, Tools, and Layout	101, 401, 402, 601, 602, 604, 605, 606, 901	15 hours
Woodworking Fundamentals	401, 402, 404, 601, 602, 604, 605, 606, 901	22 hours
Basic Electricity	105, 402, 901	15 hours
Welding Fundamentals	202, 203, 402, 601, 602, 604, 605, 606, 901	26 hours
Metal Fabrication & Project Construction	205, 402, 404, 601, 602, 604, 605, 606, 801, 901, 1201	30 hours

PACING GUIDE

880 - Welding Technology	Associated Tasks	120 Hours
Intro to Welding & Safety	101, 211, 401	10 hours
Gas Welding	601, 602, 604, 605, 606, 901	8 hours
SMAW	601, 602, 604, 605, 606, 702, 704, 901	15 hours
MIG Welding	601, 602, 604, 605, 606, 901	8 hours
TIG Welding	601, 602, 604, 605, 606, 901	16 hours
Pipe Welding	601, 602, 604, 605, 606, 901	10 hours
Project Fabrication	101, 204, 205, 601, 602, 604, 605, 606, 704, 801, 901, 1201	38 hours
Advanced Industry Welding Techniques	204, 402, 601, 602, 604, 605, 606, 901	5 hours
Robotic Welding	204, 601, 602, 604, 605, 606, 901	10 hours

881 - Ag Engine Care	Associated Tasks	120 Hours
Intro to Engines & Safety	101, 401, 904	12 hours
Basic Engine Theory - 4 Cycle/2 Cycle/Diesel	902, 904	20 hours
Engine Systems	601, 602, 604, 605, 606, 902, 1002, 1003	10 hours
Engine Tear-Down & Rebuild	204, 205, 601, 602, 604, 605, 606, 801, 901, 902, 903, 905, 906, 907, 1001, 1002, 1003, 1004, 1005, 1006	25 hours
FFA Small Gas Engine Career Development Event Introduction	101, 601, 602, 604, 605, 606, 801, 901, 902, 903, 905, 906, 907, 1001, 1002, 1003, 1004, 1005, 1006	10 hours
Engine Trouble Shooting & Customer Repair Interaction	204, 205, 211, 601, 602, 604, 605, 606, 801, 901, 902, 903, 905, 906, 907, 1001, 1002, 1003, 1004, 1005, 1006, 1201	23 hours
Hydraulic Systems and Components	402, 601, 602, 604, 605, 606, 801, 901	10 hours
Electrical Engine Systems and Components	204, 402, 601, 602, 604, 605, 606, 801, 901	10 hours

PACING GUIDE

886 - Advanced Agricultural Mechanics	Associated Tasks	120 Hours
Safety Review	101, 401	10 hours
FFA Ag Mechanics Career Development Event	101, 205, 601, 602, 604, 605, 606, 801, 901	15 hours
Community Involvement Project	101, 205, 211, 212, 213, 402, 601, 602, 604, 605, 606, 801, 901, 1201	30 hours
NOCTI Skills Review Cycles - Electrical, Transit, Welding, Small Gas Engines, Rafter, Oxyacetylene Torch	101, 204, 205, 601, 602, 604, 605, 606, 801, 901	30 hours
Individual Project Design & Fabrication & SAE	101, 204, 205, 601, 602, 604, 605, 606, 801, 901, 1201	30 hours
Shop Maintenance Skills	204, 901, 1101, 1102	5 hours

888 - Construction	Associated Tasks	120 Hours
Zoning and Permitting	101, 204, 205, 301, 302, 303, 304, 1402, 1404	8 hours
General Industry Safety	501, 502	7 hours
Construction Codes & Engineering Principles	204, 205, 303, 304	10 hours
Framing	601, 602, 604, 605, 606, 801, 901	15 hours
Concrete	601, 602, 604, 605, 606, 801, 901, 1202, 1203	15 hours
Electrical	601, 602, 604, 605, 606, 801, 901, 1207, 1208	15 hours
Plumbing	601, 602, 604, 605, 606, 801, 901, 1301, 1302, 1303	15 hours
Heavy Machine Operation	204, 601, 602, 604, 605, 606, 901	10 hours
Authentic Construction Build	101, 204, 205, 211, 301, 302, 303, 304, 601, 602, 604, 605, 606, 801, 901, 1201, 1204, 1205, 1206, 1401, 1403	25 hours

PACING GUIDE

Task List (Update from Spreadsheet)

Competency Task List – Secondary Component

Agricultural Mechanization, General CIP 01.0201

High School Graduation Years 2026, 2027, 2028

100 Supervised Agricultural Experience

Item	Task	Secondary Course Crosswalk			Understand		Do	Assessment
		All Courses	Know	Definition of SAE Identify resources	How record keeping is done in the AET system Why winning scholarships could benefit them Students will be able to use what they are doing to gain future employment			
101	Develop a Supervised Agricultural Experience (SAE) based upon individual interests and career goals.						Create an SAE for a self-directed agricultural experience	SAE Assignments

200 Business Development

Item	Task	Secondary Course Crosswalk			Understand		Do	Assessment
		Ag Business	Know	Supply Chains Commodity vs. Product	Each step of the supply chain is a critical factor in providing goods and services to the public as well as job opportunities and economic value. The value of an item changes as additional steps are needed to prepare the good or service for the public.			
201	Discuss the historical significance of agriculture to US and global economic strength.						Find evidence of steps in the supply chain for a food item	Unit 1 Quiz

202	Maintain business and financial records.	Ag Business	Business Organization Asset Depreciation Loan Principal vs. Interest Return on Assets (ROA) Breakeven Pricing	Decision-makers use financial documents to plan and manage a business. Tools such as graphs and calculators developed in spreadsheet software are commonly used for management decision-making.	Demonstrate financial calculations and analyze the results to make decisions as a potential business manager. Program formulas in spreadsheet software for automated calculations of entered records.	Business Plan Project
203	Analyze financial sources of credit for agricultural product distribution.	Ag Business	Income Statements Cash Flow Statements Balance Sheets Role of Financial Statements in Money Lending	Business managers measure the health of an enterprise by analyzing financial documents. The goal of a financial review by a lender is to minimize their own risk prior to lending money to a business or entrepreneur.	Analyze the financial health of business operations. Complete income statements, cash flow statements, and balance sheets. Identify seasonal income and expense fluctuations. Develop a process to analyze the financial position of a business for lender approval of a loan.	"A Lender's Dilemma" Activity
204	Use computers to enter, access, or retrieve data.	All Courses	Key commands Software functions and capabilities Plasma cutting functions Basic Metallurgy	Uses of technology interacting with one another to produce work that is more accurate and repeatable is more efficient than trying to produce the same level of work quality by creating a one-of-a-kind product.	Create their own image to be cut on CNC plasma cutter. Manipulate an already existing image to be cut on CNC plasma cutter Complete visual research to reverse engineer products Determine cost of materials based on current pricing	CNC plasma table lab

205	Prepare a technical report.	All Courses	Notes Dimensions Audience	Every material has advantages and disadvantages when creating products. You often have to make difficult decisions Accuracy and communication are important while sharing your ideas with other professionals inside of your industry	Determine the advantages and disadvantages of various materials for the use of engineering a new solution to a current problem.	Class design project
206	Use telephone, mobile, and social media communication techniques.	Ag Mechanics I	Quantity Product Purpose	Proper preparation and understanding help to communicate ideas more effectively	Call a local business and ask for a quote on pricing of material	Class design project
207	Analyze sales activities or agriculture business trends.	Ag Business	Product Service Market Research	The products and services provided by agribusinesses need to fit the needs of the community and provide profitable income in order for them to continue to be available.	Identify potential products and services for a retail market based on market research surveys. Calculate breakeven and use it to analyze the feasibility of an enterprise.	Unit 2 Quiz
208	Use product knowledge to meet customer needs.	Ag Business	Product Service Consumer Want vs. Need	Entrepreneurs anticipate the interests of consumers by researching trends. Competition and marketing influence consumers choosing similar goods and services.	List consumed need and want items and identify source(s) for each. Conduct market research and analyze data collected from a survey to discover a product or service to offer related to an agribusiness of interest.	Market Research Survey, Business Plan Presentation, & Marketing Plan Presentation
209	Access multi-media advertising services.	Ag Business	Marketing Advertising Promotional	There are multiple options for promotion and advertising to be considered.	Develop a marketing plan for an existing business plan.	Business Plan Presentation & Marketing Plan Presentation

210	Develop a sales presentation.	Ag Mechanics I	Audience Product Price Competition	Successful ideas must include a strong balance of form, function, and finance	Present to the group potential bill of materials for project Develop a class presentation for a finished bill of materials	Class design project
211	Demonstrate and communicate goods and/or services to the customer.	All Courses	Audience Product Price Competition History	Successful goods must meet the needs of the consumer Products must be designed to solve the customer's problem	Explain how a created project will meet the needs of a customer.	Class Presentations
212	Develop a logistics plan.	Advanced Ag Mechanics	Logistics, organizing, ordering	Materials and machines must be on a schedule to be maintained. Processes must be put in place so that there is not a loss of production when new consumables need to be ordered.	Students will identify when materials are spent. Tools and consumables will be placed in orderly locations to conveniently be able to identify.	SAE wood waste management
213	Provide customer service needs and training.	Advanced Ag Mechanics	The needs of the customer. The skill that needs training	A deep understanding of problem solving with machines and processes	Work with a customer in order to solve their problems	SAE wood waste management

300 Surveying and Land Use

Secondary Course		Crosswalk		Know		Understand		Do		Assessment
301	Define soil erosion and its causes.		Construction	Erosion, soil types,		Relationships of land and water usage		Determine ways to reduce soil erosion within a multitude of scenarios.		Permitting assignment
302	Identify the various types of land uses.		Construction	Zoning laws		Governmental zoning regulations and their parameters		Determine what zone different land areas are in and the laws that are tied to that zone.		Permitting assignment

303	Perform a site evaluation utilizing surveying equipment.	Construction	Transit, Farm level, Laser level, water level, basic measurement	The relationship between a level surface and measurements from the surface.	Take measurements from different areas and determine the difference in elevation. Research how the use of these tools is accomplished in industry	Transit assignment and practice
304	Evaluate a site's suitability for various agricultural purposes.	Construction	agricultural purposes	the parameters of suitable uses of the agricultural land in question.	Determine the purpose of a plot of ground and execute a use to solve a problem	Transit assignment and practice

400 History and Sustainability of Agricultural Power Systems Technologies

Secondary Course Crosswalk						
Item	Task		Know	Understand	Do	Assessment
401	Describe the historical development of agricultural technologies in power systems.	All Courses	Past and Present systems related to agricultural mechanics	The past must be understood to give us a direction for our future As we learn more, our methods for solving problems will change	Describe the historical development of agricultural technologies in power systems.	Intro to Ag Mech Lumber Milling
402	Identify the potential impact of global applications and emerging technologies towards sustainability.	All Courses	Historical impacts of technology New technologies currently in use	How every action that we take to create solutions for problems has an impact Resources can often be limited based on use	Identify the potential impact of global applications and emerging technologies towards sustainability.	Intro to Ag Mech Lumber Milling

500 Safety

Secondary Course Crosswalk						
Item	Task		Know	Understand	Do	Assessment
501	Complete first aid awareness training.	Ag Mechanics I	OSHA Standards	Rules are designed to keep you safe, not to be convenient.	Practice best practices	OSHA training
502	Complete an OSHA 10-hour equivalent safety course.	Ag Mechanics I	OSHA Standards	Osha	Practice best practices	OSHA training

600 Tools, Equipment, and Hardware

Secondary Course						
Item	Task	Crosswalk	Know	Understand	Do	Assessment
601	Operate hand tools and power tools.	All Courses	Hand placement Tool design Tool function	How to best operate a tool to safely perform the ideal function.	Use hand tools safely to create a project following plans provided	In class based projects
602	Operate various gauges and testers used in agricultural power equipment.	All Courses	Gauge scale Current and Voltage Theory Continuity	Technical specifications are essential for power equipment to perform according to manufacturer's recommendations.	Demonstrate accurate readings on cylinder tanks and pressure valves Use a digital multimeter to read voltage and current traveling through a circuit	In class based projects
	RESERVED (603)					
604	Operate powered shop equipment.	All Courses	Tool Function Operating procedures Machine Safety Technical specifications	Machine capabilities, uses and functions as well as safety practices.	Experience using all powered shop equipment to create an ag-related shop project	In class based projects
605	Operate and apply fasteners usage.	All Courses	Screw Bolt Rivet Staple Nail Press Clamp	When fastening needs to be permanent or removable, what type of fit and size will matter based on the fastener selected and the engineered strength of the fastener must meet the needs for the design.	Students will use various fasteners to connect multiple mediums with different methodology	In class based projects

606	Identify and apply concepts for measuring devices.	All Courses	Standard US Measurement to the nearest 16th of an inch Operations for recording a measurement to the nearest 1000th of an inch on Micrometer Decimal equivalents to fractions of an inch from 0 to 1 inch. Operation functions of a Dial Caliper	Measurement and accuracy are 2 things that must always be strived for if you want repeatability or functionality to work in a design.	Students will use Rulers, a micrometer, a dial caliper, a sheet metal gauge, and a Micrometer to take accurate measurements	In class based projects
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700 Metal Fabrication and Welding

Secondary Course Crosswalk						
Item	Task		Know	Understand	Do	Assessment
701	Identify various types of metals.	Ag Mechanics I	Know the differences between ferrous and nonferrous metals.	Materials react differently in similar situations based on their Metallurgy. Many different functions of machines will change based on the type of metal you are cutting or welding. Things like speed of rotation or melting point .	Perform tests on metals, painted and unpainted, to determine what type it is. Change machine settings to accommodate the material being worked on.	Selecting materials based off of provided plans
702	Operate arc and stick welding and cutting equipment.	Welding	Tool Function Operating procedures Machine Safety Technical specifications	There are many variables to control while setting up and operating a stick welder. Understand how to get the results you want based on the parameters given.	Properly set up a machine to weld on various thicknesses of steel. Strike and arc and run a constant feed. Successfully weld material together using a variety of joints.	Welding class assignments

703	Operate soldering equipment.	Ag Mechanics I	Capillary adhesion, Temperature, Flux	Where soldering is used in industry, the disadvantages and advantages to soldering vs welding or fasteners. How to control heat safely to solder joints.	Students will solder like and unlike metals together, Students will create a watertight seal and strong seal between 2 separate metallic surfaces.	In class based projects
704	Repair sheet metal products.	Welding	Welding, Spot welding, slip roller, break, sheer, tin snips, nip cutter, and electric power sheer	how a 3 dimensional shape starts out as a flat surface. Sheet metal stretches, shrinks, and forms in a consistent way when the proper tools are used to work the metal. Proper planning must be used to make sure the order of bends and and folds allow for the metal to work in later steps for project creation. Also sheet metal will warp and distort if too much heat is applied in any one location.	Students will use layout tools to mark cut and place holes in sheet metal. Students will fold, bend and crease sheet metal into various forms.	In class based projects
705	Fabricate a metal product.	Ag Mechanics I	Problem solving, machine functions, safety, project planning	How to plan out a project in order to solve a problem; students will understand the correlation between proper planning and execution in their experience.	Create a metal product to solve a problem	In class based projects

800 Technical Documentation

Secondary Course Crosswalk		Know		Understand		Do		Assessment
801	Interpret blueprints and schematics for welding, building, electrical, and hydraulic systems.	All Courses	Notes, Dimensions, symbols, lines, pictures	What is needed in a drawing for a worker to complete a project. How the lines and symbols help to communicate information.	Read a blueprint and build a project based on the drawing.			In class based projects

802	Create a technical drawing.	Ag Mechanics I	Notes, Dimensions, symbols, lines, pictures	What is needed in a drawing for a worker to complete a project. How the lines and symbols help to communicate information.	Create a blueprint to be read by someone else that will create the final project and include all the information necessary for them to complete.	Ag Mech 1 Design project
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900 Engine Systems

Secondary Course Crosswalk						
Item	Task		Know	Understand	Do	Assessment
901	Select mechanical equipment appropriate to the task.	All Courses	The machines and their functions within the lab environment.	Safety, machine capacity	Select machines that will most efficiently accomplish the task	Selecting equipment based on provided plans for class projects
902	Measure power output of various equipment.	Ag Engine Care	Horsepower, Torque, RPM	The true power of machines and how safety around them is paramount.	Students will measure RPM using a tachometer. Students will do a Horsepower lab measuring their own horsepower. They will compare Torque to Horsepower	Horsepower lab
903	Service and repair powertrain.	Ag Engine Care	How to read a check chart, use a torque wrench, measure with dial calipers, micrometers, telescoping gauges, feeler gauges, and other specialty tools that may be engine specific.	Tolerances, what a broken part looks like, compared to one that can be continued to be used. How all the parts work together.	Students will tear down and rebuild a powertrain while practicing taking measurements and comparing them to charts that correspond with the aspects of the engine they are using.	Gas Engine customer project

904	List and describe the operation of various engine types.	Ag Engine Care	horizontal, vertical orientations	Functions of the machine and how power needs to be converted most efficiently to accomplish a task.	Explore different engine types and create a pattern for how they are used inside of an agricultural setting.	Engine type presentations
905	Use specialized tools for engines.	Ag Engine Care	Wrenches, gauges, Power reading devices, Sleeves, pullers, removers	Engines are a very specific technology that tries to marry form and function in such a way that normal tools would not fit or accomplish their normal function in a tighter spot or under different conditions.	Use the specialty tools to complete the tasks when they require the tool use.	Class Engine tear down labs
906	Use measuring and calibration devices.	Ag Engine Care	Standard US Measurement to the nearest 16th of an inch Operations for recording a measurement to the nearest 1000th of an inch on Micrometer Decimal equivalents to fractions of an inch from 0 to 1 inch. Operation functions of a Dial Caliper	The level of complexity that is involved with the conditions of the engine working efficiently are often within 2 or 3 thousandths of an inch.	Students will measure parts of an engine to see if they meet specifications or if they are in need of replacement.	Class Engine tear down labs
907	Troubleshoot an engine and return it to working order.	Ag Engine Care	Checking spark, checking compression, checking the fuel system,	How the 4 strokes of the engine work together within their unique system to run properly.	Break down the engine into 3 parts: compression, spark, fuel, determine what system is at fault and rectify the situation.	Class Engine tear down labs

1000 Machinery and Equipment Systems

Item	Task	Secondary Course Crosswalk	Know	Understand	Do	Assessment
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1001	Review operating and service resources.	Ag Engine Care	How to find the correct resources, how to find the information they need and are looking for	Technical specification requirements and how to decipher charts and technical breakdowns to solve problems.	Use model numbers and references in order to find the correct manual to use	Class Engine tear down labs
1002	Perform safety inspections.	Ag Engine Care	Proper operation and form of designated equipment	The importance and safety of properly maintaining a piece of equipment for longevity and function.	Use a checklist to identify fluid levels, wear points, and common problems to inspect a piece of equipment regularly used in the shop.	OSHA Training
1003	Operate and calibrate machines.	Ag Engine Care	Machine function	A properly set up machine will last longer and complete jobs safer and with a higher level of accuracy.	Set up new machines and maintain old machines according to manufacturer's specifications	Class Projects
1004	Perform disassembly and assembly procedures.	Ag Engine Care	Order of operations	If parts are removed out of order or put back together in the wrong order, the machine may not operate to specification.	Disassemble and reassemble a small gas engine following a teardown plan	Class Engine tear down labs
1005	Operate machinery and power units.	Ag Engine Care	Safety and potential dangers, machine operation procedures	Power packs store energy that could potentially be harmful. Safely testing systems is a necessity, and the power that is required to test the systems can not be taken for granted.	Students will use electric starting devices as well as machinery to jump start engines and safely test the systems.	Class Engine tear down labs
1006	Maintain, troubleshoot, and repair machines.	Ag Engine Care	Troubleshoot an electric circuit, where the grease points are, and how to operate a grease gun, specifications of the machine in question as well as proper function.	The importance and safety of properly maintaining a piece of equipment for longevity and function.	Use a checklist to identify fluid levels, wear points, and common problems to inspect a piece of equipment regularly used in the shop.	Class Projects and labs

1100 Energy Systems

Secondary Course					Assessment
Item	Task	Crosswalk	Know	Understand	
1101	Identify the parts and functions of specific energy systems, e.g., electrical power, solar power, wind power, mechanical power, and chemical/carbon-based power systems.	Advanced Ag Mechanics	How energy is created, where energy is stored, how much energy is consumed	The environmental impact on energy use	Discuss and research energy in our specific region. Report on the process and findings back to the class on electric, solar, wind, and mechanical power.
1102	Identify the principles of power transmission, heat transfer, evaporation, hydraulic systems, conductivity, satellite transmission, conservation, and regulations.	Advanced Ag Mechanics	How the use of machines and technologies impacts their community and environment	The flow of cause and effect throughout technology	Explore local regulations that have to do with the technological impact of ag mechanics

1200 Agricultural Structures

Secondary Course					Assessment
Item	Task	Crosswalk	Know	Understand	
1201	Develop an itemized bill of materials and determine costs.	All Courses	Bill of Materials, Cost of materials, basic math,	Bill of materials is instrumental for making decisions for items that need to be purchased as well as making good business decisions.	Students will create a project that will require price as well as parts that they must complete a bill of materials for.
1202	Layout a structure foundation.	Construction	How to survey, square, level, and prepare a cite, local building codes	Foundation measuring and layout steps are most important to be able to build a structure on top of. If the foundation is not correct, the building will never survive.	Research local building codes, survey, square, level, and prepare a site for a building
1203	Calculate, mix, and finish concrete and masonry units.	Construction	Concrete proportions, finishing techniques	Measurement and proper techniques directly affect the quality of the product	Mix, pour, and finish a concrete slab

1204	Select building materials.	Construction	Function of building, location	Weather, location usage will all have contributing factors to style and materials used in construction.	Create a building for a specific purpose	Construction project
1205	Operate woodworking equipment/machinery, as needed in the agricultural sector.	Construction	Grain structure, species reaction to cutting tool, moisture content, woodworking safety and tool application	The medium being used to solve the problem and working with the material in question to support a stable solution.	Students will use woodworking tools to create a finished wood project from start to finish	Construction project
1206	Design a building for an application in agriculture using new technologies.	Construction	New or current technologies	How new technologies are not always feasible based on availability or demand.	Create a building for a specific purpose using new technologies	Construction project
1207	Construct various switched electrical branch circuits.	Construction	basic home wiring, local electrical code	Understand how following electric codes will help to make sure that your circuits are safe as well as effective	Create a series of branch circuits	Electrical lab
1208	Troubleshoot electrical systems.	Construction	basic home wiring, local electrical code	How Electrical tools will help you to safely determine problems in complex wiring applications	Inspect wiring and follow codes in order to troubleshoot problems. Students will use a multimeter to take electrical measurements	Electrical lab

1300 Plumbing, Irrigation, and Water Systems

Secondary Course		Crosswalk			Assessment	
Item	Task	Know	Understand	Do	Assessment	
1301	Cut, assemble, and pressure test components within various types of water supply systems.	Soldering techniques, Compression fittings	The process of using the tools correctly is important to make sure that hydraulic circuits do not leak	Students will experiment making different connections in fluid circuit to test connections	Plumbing lab	

1302	Calculate pump and pipe size based on water requirements, head, and friction losses for water and irrigation systems.	Construction	Pump calculations, reading a chart	The amount of flow is proportional to the power created by the circuit. Hazards can occur if the system cannot handle the energy created.	Students will calculate the amount of fluid needed for hydraulic circuits	Plumbing lab
1303	Identify the components in various agricultural irrigation systems.	Construction	pumps, hoses, tanks	How the parts of an irrigation system work together to accomplish the goals of the system	Use and identify parts in an agricultural system	Plumbing lab

1400 Environmental and Natural Resource Systems

Secondary Course Crosswalk						
Item	Task	Know			Do	Assessment
1401	Identify environmental problems and use equipment and tools needed to measure the issues in agriculture.	Construction	Surveying equipment use, how to take a soil sample	Why the makeup of the soil will affect the agricultural structure that will be used on it	Survey a plot of land and take a soil sample	Construction Project
1402	Use various map types and aerial photos for natural resource management and conservation.	Construction	How to fly a drone	How aerial footage can be used to solve problems with land use in an agricultural setting	Fly a drone and take photos	Permitting assignment
1403	Identify global positioning systems, remote sensing, and collection equipment for various applications.	Construction	GPS, trilateration	Use the mapped points to solve agricultural problems	Use GPS to map data points	Construction Project
1404	Identify and evaluate storage and waste disposal systems and procedures.	Construction	Trash, Recycling, energy	Where it goes, what is done with it, how it can be used for creating energy or improving the environment	Discuss and explore waste management and recycling procedures	Permitting assignment