



Perris Union High School District Course of Study

A. COURSE INFORMATION

<p>Course Title: (limited to 34 characters with spaces in Infinite Campus)</p> <p style="border: 1px solid black; padding: 2px;">Agriculture Mechanics II</p> <p><input checked="" type="checkbox"/> New <input type="checkbox"/> Revised</p> <p>If revised, the previous course name if there was a change</p> <p style="border: 1px solid black; height: 20px; margin: 5px 0;"></p> <p>Transcript Course Code/Number:</p> <p style="border: 1px solid black; height: 20px; margin: 5px 0;"></p> <p>(To be assigned by Educational Services if it's a new course)</p> <p>CREDIT TYPE EARNED: CALPADS CODE:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 50%; padding: 2px;">Elective</td> <td style="width: 50%; padding: 2px;">7122</td> </tr> </table>	Elective	7122	<p>Subject Area:</p> <p><input type="checkbox"/> Social Science <input type="checkbox"/> English <input type="checkbox"/> Mathematics <input checked="" type="checkbox"/> Laboratory Science <input type="checkbox"/> World Languages <input type="checkbox"/> Visual or Performing Arts <input type="checkbox"/> College Prep Elective <input type="checkbox"/> Other</p> <p>Is this classified as a Career Technical Education course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If yes, which pathway does this course align to? Pathway Name: <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Agriculture Mechanics</div> CTE CDE Code: Pathway 101</p>	<p>Grade Level(s)</p> <p><input type="checkbox"/> MS <input checked="" type="checkbox"/> HS <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input checked="" type="checkbox"/> 10 <input checked="" type="checkbox"/> 11 <input checked="" type="checkbox"/> 12</p>
Elective	7122			
<p>Was this course <u>previously approved by UC for PUHSD?</u></p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Will be verified by Ed Services)</p> <p>Which A-G Requirement does/will this course meet?</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 50%; padding: 2px;">G</td> <td style="width: 50%; padding: 2px;"><input type="checkbox"/> Pending</td> </tr> </table>	G	<input type="checkbox"/> Pending	<p style="background-color: yellow; text-align: center;">Credential Required to teach this course: To be completed by Human Resources only.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>CTE: Agriculture and natural Resources Single Subject: Agriculture</p> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 60%; text-align: center;"> <p>Signature</p> </div> <div style="border: 1px solid black; padding: 5px; width: 30%; text-align: center;"> <p>2/13/2024</p> <p>Date</p> </div> </div>	
G	<input type="checkbox"/> Pending			
<p>Submitted by: Matthew Thomas Site: SSC Date: 02/09/2024 Email: matthew.thomas@puhsd.org</p>	<p>Unit Value/Length of Course:</p> <p><input type="checkbox"/> 0.5 (half-year or semester equivalent) <input checked="" type="checkbox"/> 1.0 (one-year equivalent) <input type="checkbox"/> 2.0 (two-year equivalent) <input type="checkbox"/> Other:</p>			
<p>Approvals</p>	<p>Name/Signature</p>	<p>Date</p>		
Director of Curriculum & Instruction		02/09/2024		
Asst. Superintendent of Educational Services		02/08/2024		
Governing Board				

Prerequisite(s) (REQUIRED):
Agriculture Mechanics I
Corequisite(s) (REQUIRED):
n/a
Brief Course Description (REQUIRED):
<p>Agriculture Mechanics II is a step more in depth and builds off of the knowledge learned in the Agriculture Mechanics I course. The course involves the basic skills needed in the field of agriculture and prepares students for basic life and career readiness. They include, tool use and maintenance, shop safety, measurements, plumbing, electrical, arc welding, concrete, general farm maintenance, equipment operation and maintenance. This course includes classroom instruction, and practical lab work in the shop. In each unit, the students will explore the fundamentals on each topic and throughout notes, quizzes and practicum show their understanding of the topic. Instruction is also given in leadership, citizenship, and project programs through FFA and Department activities. The students are to build an approved fair project of their choice to compete against other local programs in the area. This project allows students to demonstrate mastery of one or more skills earned during the class.</p>

B. COURSE CONTENT

Course Purpose (REQUIRED): <i>What is the purpose of this course? Please provide a brief description of the goals and expected outcomes. Note: More specificity than a simple recitation of the State Standards is needed.</i>
<p>In this course, students will study theories relating to the transfer of matter and energy through electrical, fluid and mechanical systems. Students will also study more advanced fundamentals of mechanical and structural systems and facilities. Students will explore professional opportunities in the field of agricultural mechanics. Integral to this will also be the opportunity to participate in activities developed through a student leadership organization. By participating in this program, students will be better prepared to matriculate into post-secondary Agriculture programs.</p>
Course Outline (REQUIRED):

Detailed description of topics covered. All historical knowledge is expected to be empirically based, give examples. Show examples of how the text is incorporated into the topics covered.

Unit 1: Using the Ag Mechanics Shop

In this unit the students will learn to recognize major work areas and use safe procedures when working in an agricultural mechanics shop. Students will also learn to interpret safety colors and codes, protect the body against injury, and work safely in agricultural mechanics settings. Students will become aware of and recognize and reduce hazards in agricultural mechanics settings, and to react effectively in case of fire or other emergencies. This knowledge will be demonstrated by completion of assignments, experiential learning, and a unit test. Information learned in Unit 1 will be utilized throughout the course.

Unit 1: Using the Ag Mechanics Shop Assignments

- Students begin the course with a section on safety in the shop. Cornell Note-taking format is taught. Specific tool safety is covered for each tool being introduced. Safety is an ongoing practice throughout the course with specific instruction and reinforcement to complement each unit. Students keep notes and directions regarding shop safety throughout the course. Using notes; students track, annotate, and respond in writing to all materials covered in class.
- Working With a Disability: After learning about major shop accidents and typical bodily injury locations, students will complete all class work for the period with a "disability". Students will draw from a can to determine which body part is injured (hand, arm, eyes, leg, etc.). Students will then be given a list of tasks to complete with their injury. This role play activity is meant to help educate students as to the challenges that can come from general shop injuries and to inform them of how easily most shop accidents can be avoided by wearing the appropriate attire and personal protective equipment. To culminate the activity, students will write about how accidents can be avoided by use of Personal Protective Equipment (PPE). Equipment Check and Awareness of Environment - Four different scenarios will be set-up in the classroom shop. Each scenario will provide a work environment, tools, and project to be done. Students will observe the scene and read the script regarding the project to be completed. Students must determine if all safety materials are present and complete a tool/machine safety check. If items needed are missing from the scene students have to make recommendations about how the scene could be improved. Once complete the students will come up with a protocol to safely and effectively complete the scenario's task.
- Students will identify the tools in the shop and create a guidebook with descriptions, images and safety points for each of the tools. Descriptions and safety must be detailed and complete. The guidebook can be printed or in a PowerPoint and must be completed before a student can move on to take the safety test.

Unit 2: Measuring Up

During this unit the students will learn how to select and use appropriate layout tools and procedures for electrical, plumbing, and woodworking. This knowledge will be demonstrated by completion of assignments, experiential learning, and a unit test. Concepts and practices learned in Unit 2 will be used

throughout this course.

Unit 2: Measuring Up Assignments

- Use and Identification - Students will identify measurement and layout tools of the industry as well as their correct usage. Information obtained will be included in their interactive notebooks. Pictures of the tools along with a scenario detailing proper use will also be present.
- A Fraction of an Inch - Students learn by teaching. For this assignment, students must make a story book that teaches a K-2 student how to read a ruler. The students' storybooks must show measurement to 1/16". Students must also demonstrate understanding of reducing fractions. Story books will be graded based on a rubric format.
- In this activity students will understand that the term "SCALE" has a dual meaning in project design and drawings. Scale refers to the ratio of the linear size of the model to the size of the real object being modeled. A problem based worksheet is also provided to help students understand scale factors and define the ratio of a model size relative to the actual object that the model represents. The Teacher will tap into prior knowledge in understanding that models and toys have different scales in relation to the real object being modeled. Students will understand that key parts to every scale drawing are the scale factor and the degree to which scale models have been reduced in size, compared to the original. Students will demonstrate their understanding of scale by completing a table showing real life sizes of various objects (10 items to be provided by teacher, 10 items to be selected by student) and then their scaled size in inches.
- Supersize Me! - After studying scale factor, students choose an everyday object and enlarge it using a feasible scale factor of their choice and appropriate layout tools in the shop. Students use wood to design all or most components of the object but may supplement the object with other materials. Students apply their knowledge of ratio and proportion to create the enlarged objects. After designing the object, students analyze how increasing dimension affects surface area and volume. The outcome of this project is a new, larger object. Students understand scaling-up and scaling-down in theory and in practice.
- Students will need to demonstrate their understanding of various measurement tools such as tape measure, ruler and informal measurement. Students will go from station to station to demonstrate their understanding of use and how to read each measurement tool.

Unit 3: Electricity & Electronics

The students will learn to use principles of electricity and safety for planning simple wiring systems. Electricity is the major power source for stationary equipment in houses, farm, and ranch buildings, and agribusiness. It is the energy source commonly used for driving machinery, and for lighting, heating, and cooling. Some knowledge of electricity is essential for the safe use of electrical equipment. Understanding how to wire simple circuits and make minor electrical repairs is also useful. It is important to maintain electrical circuits and equipment properly to ensure their long life and safe operation. Major areas of instruction include; Electrical Principles and Wiring, Installing Branch Circuits, and Electronics in

Agriculture. Knowledge will be demonstrated by completion of assignments and quizzes, and experiential learning.

Unit 3: Electricity & Electronics Assignments

- **Use and Identification:** Students will identify tools of the electrical and electronics industry as well as their correct usage. Pictures of the tools along with a scenario detailing proper use will also be present in their shop safety guidebook for study reference.
- **Introduction to Conductivity:** A conductor is anything that allows an electrical current to flow easily through it. An electric current consists of moving particles called electrons or ions. Solids that conduct electricity have mobile electrons that are loosely held by their atoms. On the other hand, solids that obstruct or prevent the flow of electric current are called insulators or non-conductors. These particular solids have electrons that are closely bound to their atom's nucleus and are generally not free to move. In this activity students learn basic concepts about conductivity of electric current through solids and some liquids and solutions. Students will use a conductivity indicator to determine whether certain solid materials are conductors or insulators as well as some liquids. Student findings will be included in their class notebook as well as their original predictions on the item's conductivity.
- **Saving Energy -** Energy is more than numbers on a utility bill; it is the foundation of everything we do. All of us use energy every day – for transportation, cooking, heating and cooling rooms, manufacturing, lighting, water use, and entertainment. We rely on energy to make our lives comfortable, productive, and enjoyable. Sustaining this quality of life requires that we use our energy resources wisely. The careful management of resources includes reducing total energy use and using energy more efficiently. Students will complete a variety of tasks and projects related to identifying energy use and determining how energy can be saved.
- **Electrical Nameplates –** Students will use the electrical plates found on machinery in the Ag Mechanic's shop to provide the amperage and volts of the machines. They will then use that information to calculate how many watts each machine uses. Once students have calculated watts, they will then determine the cost to operate the machine for the duration of a year.
- **Environmental Impacts:** Students will build upon the previous activity by determining the environmental impact of operating the shop equipment. The general rule is that on average every kilowatt hour of electricity produces 1.6 pounds of carbon dioxide.
- **Energy Guide Labels / Comparing Appliances -** Students will use Energy Guide labels from 2 similar machines. Their task is to choose the machine that is most economical considering purchase price as well as cost of operating the machine for expected life.
- **School Energy Audit:** Students will conduct an energy audit of the school. Students will collect data on classroom light usage during the day, including bathrooms, offices, outside lights and the gym. They will look at light bulbs and calculate how much energy is being used per room. We will take a

look at the school's electricity bill, provided by the Energy Department at the district office. They will research to find the source of energy being provided to our school. And finally they will create a plan and share it with the administration and teachers on how we can all conserve our energy

- **Math in Electricity:** Students will use mathematical formulas throughout the electrical unit. Students will learn how to manipulate the formula $Watts = Volts \times Amperes$ to calculate watts, amperes and volts. Students will also calculate load capacity for various branch circuits. Students will also troubleshoot if a 40 ampere circuit has enough power to operate specified equipment/machinery.
- **Wire a Complete Circuit:** Students will be given free selection of various supplies including various size batteries and light bulbs, as well as conductors and non - conductors. Students will work individually and in pairs to demonstrate their understanding of simple and parallel circuits. Students will diagram every attempt they make at creating a circuit. Once they are able to get their light bulb lit, they will explain why this method worked, and specify why each previous attempt failed. Students must use electrical terminology in their justification. Students will then use knowledge learned in lecture and lab to construct a simple circuit. Students must incorporate a duplex receptacle, switch, and fixture in their circuit. Assignment will be evaluated based on proper use of tools and supplies, safety of wire connections, and workability of the circuit.

Unit 4: Irrigation Systems & Water Use

Students will be designing a mock irrigation system for a greenhouse as well as help to maintain the current irrigation system in the school greenhouse. Furthermore they will assemble a small personal irrigation system using materials typical to those used in agriculture. Students will identify plumbing materials, equipment and perform basic plumbing procedures. Students will be able to install, identify, and maintain irrigation systems.

Unit 4: Irrigation Systems & Water Use Assignments

- Students will design and describe water heater systems, well systems, and septic systems. During this project students will be working on maintaining pipes and plumbing equipment, describing and identifying plumbing fittings and components, identifying and describing the use of plumbing tools. They will also identify and describe 3 main irrigation practices.
- Create models of irrigation methods and explain which methods are suitable for various crops in our region. Describe the water cycle and how that affects each water system.
- Students will create and build or modify an irrigation system or hydroponic system for the school greenhouse for aquaponics/hydroponics systems. Students will create this project in small groups and gather any materials from school after creating a project plan learned in Ag Mechanics 1. Students will still practice plumbing skills with copper and PVC pipe by creating a small sprinkler. They will practice measuring, cutting, and gluing/soldering plumbing materials.

Unit 5: Understanding Design and Fabrication Processes Using Shielded Metal Arc Welding

Students will understand the basic theory of SMAW welding, understand and identify five basic welding

joints, and identify and correct basic weld defects. Students will begin learning to run a bead. Once they have general safety and process they will be able to move onto the key assignments.

Unit 5: Understanding Design and Fabrication Processes Using Shielded Metal Arc Welding Assignments

- Following an instructor-led demonstration the students will use the SMAW machines to assemble a butt joint, corner joint, tee joint, lap joint, and an edge joint. They will be asked to focus on safety and proper technique. Following the creation of these joints, the students will be asked to use their analytical skills to grade and judge the welds that they created. Students will be asked to focus on weld defects discussed in class. Furthermore they will be asked to explain how to prevent these defects from occurring in their future welds.
- Students will work with the instructor to create the 5 joints listed above. After they do so with the instructor, they will then create their own joints by themselves and show proper safety for themselves and others. Students will then analyze all joints completed and rank them. The students will see other welds compared to their own to use for guidance and reference to create a better weld for themselves. They will be asked to analyze speed and current settings.

Unit 6: Concrete and Masonry

During this unit students will understand that concrete is one of the most durable materials used in construction. They will be able to identify proper tools, what raw materials are used to make concrete. Students will demonstrate how to perform a proper slump test, prepare workable batches of concrete. Students would have to describe or demonstrate various methods of soil compactions and how groundwork is used to prepare a job site. Students will explain how to properly place concrete slabs, and techniques for finishing concrete. Students will demonstrate and identify tools used in the concrete and masonry industry.

Unit 6: Concrete and Masonry Assignments

- Components of concrete: Students will create a 3D visual of the main components that are in basic concrete and explain what their purpose is. The students will gather the materials from home or outside to put together the model. Mixing: Students will mix a batch of concrete and demonstrate their understanding on how to properly mix the concrete.
- Math and Calculations: Students will create a job site on paper and write out a materials list for how much concrete is needed for the project and demonstrate their calculations on how they got their order.
- Students will create a presentation that demonstrates how they use proper tools and techniques to properly finish a concrete job.
- As a class, students will be given a small measured area that they need to prepare and pour concrete in a slab. The students will produce a small slab, and will learn the proper mixing, preparing and finishing techniques for pouring a slab.

Unit 7: Careers in Agricultural Mechanics

Throughout the course students will explore career opportunities, job applications, job descriptions, qualifications and requirements, education and training, and experience methodologies. This knowledge will be demonstrated by completion of assignments, experiential learning, and a unit test.

Unit 7: Careers in Agricultural Mechanics Assignments

- Students will update their portfolio of careers that interest them. For each career they will identify the training or education that is needed, the expectations of the career and salary. Students will update their career plan based on where they hope to be in 5 years. They will research a career that they have learned from in the past lessons. The students will research the job description, qualifications and education required. Students will create a hypothetical budget that includes student loans, living expenses, insurance and any other expenses, as well as an income for each month. Students will also fill out job applications from various positions in the career field.
- Resume and Cover Letter- This will be updated throughout their high school career as they obtained more skills throughout the Ag Mechanics courses. Students would be encouraged to shadow individuals that are working in the agricultural field that they would like to study.
- Students will be able to utilize their knowledge from class to pass a mock interview for their particular area of study.
- Create a resume for a career of their choice in the Ag Mechanics field. Students will be keeping record of the skills they have learned throughout the course, as well as hours on projects that they complete in class. They will then create a working resume showcasing.
 - The resume and cover letter would be the working document that the students will create from their work and skills in class.
 - They will learn to keep an accurate record of their projects and skills learned and how to update their resume each year after they have acquired more skills from the Ag Mechanics class.

Writing Assignments (REQUIRED):

Give examples of the writing assignments and the use of critical analysis within the writing assignments.

Design Plans: Students will design and describe water heater systems, well systems, septic systems and irrigation systems.

Record of Skills Log/ Resume Writing: Students will keep a record of the skills they have learned throughout the course, as well as hours on projects that they complete in class. They will then create a working resume showcasing what they have accomplished in the class and what skills they have acquired.

Cover Letter: Students will create a cover letter for their portfolios. This letter will showcase skills obtained in the course and information collected in their Skills records.

Job Applications: Students will practice applying for jobs within different fields to help prepare them for life after high school.

Career Plan: Students will research and write a career plan that will assist them in searching for career opportunities after graduation.

Fair Project: The students are to build an approved fair project of their choice to compete against other local programs in the area. This project allows students to demonstrate mastery of one or more skills earned during the class.

INSTRUCTIONAL MATERIALS (REQUIRED)

Textbook #1

Title: Agricultural Mechanics and Technology Systems

Edition: 2nd

Author(s): J.P. Hancock, Don W. Edgar Ph.D., Michael L. Pate Ph.D., Lori A. Dyer, W. Brian Hoover Ph.D.

ISBN: 978-1-68584-503-2

Publisher: The Goodheart-Willcox Co., Inc.

Publication Date: 2024

Usage:

- Primary Text
- Read in entirety or near

Textbook #2

Title:

Edition:

Author:

ISBN:

Publisher:

Publication Date:

Usage:

- Primary Text
- Read in entirety or near

Supplemental Instructional Materials *Please include online, and open source resources if any.*

Lab Workbook: The Laboratory Workbook combines review activities and practical applications that relate to the content of the textbook chapters. Questions designed to reinforce the textbook content help students review their understanding of the terms, concepts, theories, and procedures presented in each lesson. The Laboratory Workbook includes two types of student activities. The first type of activity consists of questions designed to reinforce the content of the textbook and review vocabulary to ensure students learn key terms. Completing these activities helps students gain a deeper understanding of the terms, concepts, theory, and procedures presented in the chapter. The second type consists of more than 60 hands-on lab activities, designed to be completed in the classroom with instructor guidance and supervision. These "lab" activities provide an opportunity to apply and extend the knowledge gained from the textbook. 978-1-68584-993-1

Estimated costs for classroom materials and supplies (REQUIRED). *Please describe in detail.*
 If more space is needed than what is provided, please attach a backup as applicable.

Cost for a new class set of textbooks: \$ 7,000	Description of Additional Costs:
Additional costs:\$	
Total cost per class set of instructional materials:	\$

Key Assignments (REQUIRED):

Please provide a detailed description of the Key Assignments including tests, and quizzes, which should incorporate not only short answers but essay questions also. How do assignments incorporate topics? Include all major assessments that students will be required to complete

Rotation Stations: Students will go from station to station to demonstrate their understanding of use and how to read each measurement tool.

Electrical Nameplates Activity: Students will use the electrical plates found on machinery in the Ag Mechanic's shop to provide the amperage and volts of the machines. They will then use that information to calculate how many watts each machine uses. Once students have calculated watts, they will then determine the cost to operate the machine for the duration of a year.

Environmental Impacts Activity: Students will build upon the previous activity by determining the environmental impact of operating the shop equipment. The general rule is that on average every kilowatt hour of electricity produces 1.6 pounds of carbon dioxide.

Energy Guide Labels / Comparing Appliances: Students will use Energy Guide labels from 2 similar machines. Their task is to choose the machine that is most economical considering purchase price as well as cost of operating the machine for expected life.

School Energy Audit Activity: Students will conduct an energy audit of the school. Students will collect data on classroom light usage during the day, including bathrooms, offices, outside lights and the gym. They will look at light bulbs and calculate how much energy is being used per room. We will take a look at the school's electricity bill, provided by the Energy Department at the district office.

Concrete Slab Activity: As a class, students will be given a small measured area that they need to prepare and pour concrete in a slab. The students will produce a small slab. in producing the lab the students will learn the proper mixing, preparing and finishing techniques for pouring a slab.

Student Career Portfolio: Students will fill out job applications from various positions in the career field. Students will add a resume and cover letter to their portfolio. This will be updated throughout their high school career as they obtained more skills throughout the Ag Mechanics courses. Students will learn to keep an accurate record of their projects and skills learned and how to update their portfolio.

Research Presentation: Students will research a career plan based on where they hope to be in 5 years. They will research a career that they have learned from in the past lessons. The students will research the job description, qualifications and education required. Students will create a hypothetical budget that includes student loans, living expenses, insurance and any other expenses, as well as an income for each month.

Fair Project: The students are to build an approved fair project of their choice to compete against other local programs in the area. This project allows students to demonstrate mastery of one or more skills earned during the class.

Instructional Methods and/or Strategies (REQUIRED):

Please list specific instructional methods that will be used.

- Oral In-Class Participation/Classwork
- Focus activities
- Hands-On Scenarios
- Student Presentations
- Quizzes and Tests
- Writing Assessments
- Projects (Performance, Written and Oral Assessment)

Assessment Methods and/or Tools (REQUIRED):

Please list different methods of assessments that will be used.

- Vocabulary/Terminology Assessments
- Lesson Assessments
- Unit/Chapter Assessments
- Individual Performance Task(s)
- Group Performance Task(s)
- Cumulative Semester Finals

COURSE PACING GUIDE AND OBJECTIVES (REQUIRED)

Day(s)	Objective	Standard(s)	Chapter(s)	Reference

C. HONORS COURSES ONLY

Indicate how much this honors course is different from the standard course.

D. BACKGROUND INFORMATION

Context for course (optional)

History of Course Development (optional)