

Agricultural Mechanics

COURSE OUTLINE

1. **Course Title:** Agricultural Mechanics
2. **CBEDS Title:** Mechanics and Engineering Technology
3. **CBEDS Number:** 4030
4. **Job Titles:**

Farm Machine Operator	Farm Equipment Mechanic
Farm Machine Tender	Farm Equipment Mechanic Apprentice
Farm equipment Operator	Farm Machine Set-Up Mechanic
Field Hauler	Inspector & Tester (Ag Equip)
Ranch hand	Assembly Repairer (Ag Equip)
Farm Hand - General	Equipment Greaser
Heavy Equipment Operator	Ag Equip Assembler & Fitter
Tractor Mechanic Helper	Truck Driver

5. Course Description:

This competency-based course prepares students for entry-level positions in the Agriculture industry. Students will study farm equipment operation, repair welding, general farm maintenance including fence and shed construction, electricity, plumbing, concrete, surveying and rope work. This course includes classroom instruction, practical lab work on farm equipment.

Student Outcomes and Objectives:

Students will:

1. Demonstrate the ability to use equipment for different leveling, profile leveling, and contour mapping.
2. Identify and maintain tools used for the subject areas of the course.
3. Demonstrate the ability to plumb water systems using steel, copper, and plastic pipe.
4. Demonstrate skills needed for fabrication using lumber.
5. Demonstrate skills needed to layout and fabricate sheet metal items.
6. Demonstrate the ability to electrically wire a service entrance panel for 110 volt and 220 volt service and complete a variety of electrical circuits.
7. Demonstrate the ability to make common knots, hitches, and splices.
8. Demonstrate the ability to read a blue print.

Integrated throughout the course are career preparation standards, which include basic academic skills, communication, interpersonal skills, problem solving, workplace safety, technology, and employment literacy.

Pathway

Recommended Sequence	Courses
Introductory	Agricultural Mechanics
Skill Building	Ag Welding & Metals Fabrication or Power Mechanics
Advanced Skill	Supervised Agricultural Experience Project

6. Hours: *Students receive up to 180 hours of classroom instruction.*

7. Prerequisites: None

8. Date (of creation/revision): July 2010

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Upon successful completion of this course, students will be able to demonstrate the following skills necessary for entry-level employment.				
Instructional Units and Competencies	Course Hours	Model Curr. Standards	CA Academic Content Standards	CAHSEE
<p>I. CAREER PREPARATION</p> <p>A. Career Planning and Management.</p> <ol style="list-style-type: none"> 1. Know the personal qualifications, interests, aptitudes, knowledge, and skills necessary to succeed in careers. <ol style="list-style-type: none"> a. Students will identify skills needed for job success b. Students will identify the education and experience required for moving along a career ladder. 2. Understand the scope of career opportunities and know the requirements for education, training, and licensure. <ol style="list-style-type: none"> a. Students will describe how to find a job. b. Students will select two jobs in the field and map out a timeline for completing education and/or licensing requirements. 3. Know the main strategies for self-promotion in the hiring process, such as completing job applications, resume writing, interviewing skills, and preparing a portfolio. <ol style="list-style-type: none"> a. Students will write and use word processing software to create a resume, cover letters, thank you letters, and job applications. b. Students will participate in mock job interviews. 4. <i>Develop a career plan that is designed to reflect career interests, pathways, and postsecondary options.</i> <ol style="list-style-type: none"> a. <i>Students will conduct a self—assessment and explain how professional qualifications affect career choices.</i> 5. <i>Understand the role and function of professional organizations, industry associations, and organized labor in a productive society.</i> <ol style="list-style-type: none"> a. <i>Contact two professional organization and identify the steps to become a member.</i> 6. <i>Understand the past, present and future trends that affect careers, such as technological developments and societal trends, and the resulting need for lifelong learning.</i> <ol style="list-style-type: none"> a. <i>Students will describe careers in the agricultures industry sector.</i> b. <i>Students will identify work-related cultural differences to prepare for a global workplace.</i> <p>B. Technology.</p> <ol style="list-style-type: none"> 1. Understand past, present and future technological advances as they relate to a chosen pathway and on selected segments of the economy. 2. Understand the use of technological resources to gain access to, manipulate, and produce information, products and services. 3. Use appropriate technology in the chosen career pathway. <p>C. Problem solving and Critical Thinking.</p> <ol style="list-style-type: none"> 1. Understand the systematic problem-solving models that incorporate input, process, outcome and feedback components, and apply appropriate problem-solving strategies and critical thinking to work-related issues and tasks. 	<p>10</p> <p>Additional hours are integrated throughout the course.</p>	<p>Transportation Industry Sector, Model Curriculum Standards</p> <p>3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0</p>	<p><u>Language Arts</u> (8) R 1.3, 2.6 W1.3, 2.5. LC 1.4,1.5 1.6 LS1.2, 1.3, (9/10) R2.1,2.3,2 W2.5 LC1.4 LS 1.1, 2.3 (11/12) R2.3 W2.5 LC1.2 <u>Math</u> (7) NS1.2, 1.7 MR 1.1,1.3 2.7,2.8, 3.1</p>	<p>Lang. Arts R 8.2.1 (9/10) R 2.1, 2.3 W2.5 Math (7) NS 1.2, 1.3, 1.7 MR 1.1, 2.1, 3.1</p>

<p>2. Use and apply critical thinking and decision making skills to make informed decisions, solve problems, and achieve balance in the multiple roles of personal, home, work and community life.</p> <p>D. Health and Safety.</p> <ol style="list-style-type: none"> 1. Know policies, procedures, and regulations regarding health and safety in the workplace, including employers' and employees' responsibilities. 2. Understand critical elements of health and safety practices related to a variety of business environments. <p>E. Responsibility & Flexibility.</p> <ol style="list-style-type: none"> 1. Understand the qualities and behaviors that constitute a positive and professional work demeanor. 2. Understand the importance of accountability and responsibility in fulfilling personal, community, and workplace roles and how individual actions can affect the larger community. 3. Understand the need to adapt to varied roles and responsibilities. <p>F. Ethics and Legal Responsibilities</p> <ol style="list-style-type: none"> 1. Know the major local, district, state, and federal regulatory agencies and entities that affect the industry and how they enforce laws and regulations. 2. Understand the concept and application of ethical and legal behavior consistent with workplace standards. <ol style="list-style-type: none"> a. <i>Contact a business and obtain a copy of their rules for employment.</i> b. <i>Role play difference ethical scenarios.</i> 3. Understand the role of personal integrity and ethical behavior in the workplace. <p>G. Leadership and Teamwork.</p> <ol style="list-style-type: none"> 1. Understand the characteristics and benefits of teamwork, leadership, citizenship in the school, community, and workplace settings for effective performance and attainment of goals. 2. Understand the ways in which professional associations, such as FFA, and competitive career development activities enhance academic skills, career choices, and contribute to promote employability. 3. Know multiple approaches to personal conflict resolution and understand how to interact with others in ways that demonstrate respect for individual and cultural differences and for the attitudes and feelings of others. 				
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Instructional Units and Competencies	Hours	Industry Standards.	CA Academic Standards	CAHSEE
TOOL USE AND MAINTENANCE AND SHOP SAFETY FOR FARM CONSTRUCTION WORK Hand & Power Tools Tool Identification, Safety, and Use Tool Selection for the Ag Mechanics Shop Sharpening Hand Tools and Grinder Safety Grinder and Wheel Selection Tool Sharpening Procedures Tool Handle Fitting Cutting Tool Construction and Repair Surveying, squaring and leveling tools. Safety Rules and Conditions Shop Safety Practices Shop Cleaning and Tool storage	15	Ag & Natural Resource Ind. Sector Ag. Mech. PW B1.1 B1.2	ELA 11-12; R; 2.3	
MEASURING AND MARKING Measurement Systems Reading Measuring Tools Calipers and Micrometers Linear Measurements Square Measurements Cubic Measurements Weights and Measures	15	Eng. & Design Ind. Sector Eng. Tech. PW D6.5	M. 8-12; Geom.; 8.0	M.7; MAG 1.1 & 1.3
FASTENERS Types and Uses of Fasteners Selecting Fasteners	3	Ag. Mech. PW B2.3		
WOOD WORKING Selecting Wood & Lumber Measuring & Marking Wood Woodworking Hand Tools Woodworking Power Tools Fastening Wood Joints	22	Ag. Mech. PW B2.1 B2.2		
SHEET METAL: Metalworking Safety Identification and Use of Basic Metalworking Tools. Types and Properties of Common Metalworking Materials Layout and Transferring on Metal Sheet Metalwork Cutting & Bending	22	Ag. Mech. PW B5.1 B5.2 B5.3 B5.4		
PLUMBING: Plumbing Materials Plumbing Fittings Plumbing Tools Layout and Measuring Environmental Influences Installation of a Plumbing Project	15	Ag. Mech. PW B4.1 B4.2 B4.4		
CONSTRUCTION MATERIALS Calculating necessary materials and creating a materials list. Generating and calculating bills of materials Fasteners (All Types)	7	Ag. Mech. PW B2.3		
PROJECT DESIGN Blueprint reading Preparing a Working Drawing Project Planning & Construction	3		ELA; 11-12; R 2.6	

Instructional Units and Competencies	Hours	Industry Standards.	CA Academic Standards	CAHSEE
ELECTRICAL Electrical Safety Wire Splices and Connections Conductors and Over-current Protection Simple Circuit Installation (Lights & Receptacles) Service Entrance Panels 120 and 240 volt circuits Testing Electric Circuits	17	Ag. Mech. PW B3.1 B3.2 B3.3		
ROPEWORK Selection and Use of Rope Rope Identification and Care Knots, Hitches, and their Uses Splicing Rope	5	Ag. Mech. PW B1.3		
INTRODUCTION TO WELDING: Arc Welding Welding Equipment and Safety Striking and Maintaining an Arc Four Basic Weld Joints Controlling Distortion Weld Testing Oxyacetylene Welding Oxyacetylene Equipment & Safety Oxyacetylene Equipment Setup Four Basic Oxyacetylene Welds Brazing, Cutting, and Heating of Metal	37	Ag. Mech. PW B8.1 B8.3 B8.4 B7.1 B7.2 B7.5	S. 9-12; Physics; 5b M. 9-12; Algebra 1; 3.0 & 4.0 S. 9-12; Chemistry ; Substrand : 1	
EQUIPMENT OPERATION & MAINTENANCE Equipment Operation Safety Oil & Filter Maintenance Air Filter Maintenance Fuel Filter Maintenance Battery Maintenance Hydraulic System Maintenance Hazardous Agricultural Chemicals	6	Ag. Mech. PW B11.1 B11.2 B11.3		

10. Additional recommended/optional items

- a. Articulation: *None currently exist.*
- b. Academic credit: *No alternative academic credit agreements currently exist*
- c. Instructional strategies:

Assignments:

Tool identification, reports, and lab participation.

Methods of Evaluation:

The types of writing assignments required:

Written homework

The problem-solving assignments required:

Homework problems

Quizzes

Exams

The types of skill demonstrations required:

Class performances

Projects to match skills

The types of objective exams used in the course:

Multiple choice

True/False

Matching items

Completion

- d. Instructional materials: *Textbook: Agriculture Mechanics Fundamentals and Application 2nd edition.*

e. Certificates: Identify requirements to receive certificates. In longer courses, where several certificates/records of competency may be obtained, course units/competencies needed for each should be identified.