CHINO VALLEY UNIFIED SCHOOL DISTRICT
INSTRUCTIONAL GUIDELINES
AGRICULTURAL MECHANICS II

Course Number	5839
Department	Agriculture
Prerequisite	Completion of Agricultural Mechanics I with a B or better and/or teacher approval
Length of Course	Two (2) semesters/One (1) Year
Grade Level	10 -12
Credit	5 units per semester/10 total credits - elective
Repeatable	May be repeated for an additional ten (10) credits
UC/CSU	Does not meet a-g requirement
Board Approved	December 10, 2009

Description of Course – This course will introduce the student to advanced skills required in the agricultural mechanics field. The course includes proper safety procedures and proper use of tools found in agricultural mechanics. Each student will maintain a Supervised Agriculture Experience Program project in relation to his level of advancement in the school's agriculture program and in line with state curricular guidelines. Students will also be involved in Future Famers of America (FFA) leadership experiences. This course is aligned with the California State Standards for Agriculture Mechanics.

Rationale for Course – This course provides students with important life skills, allows hands-on exploration in the fields of agriculture science and technology, and prepares individuals for advanced education and/or training at a postsecondary level.

Standard 1 – Students learn shop orientation and procedures.

1.1 Objective: Recognize major work areas and use safe procedures when working in an agricultural mechanics shop.

1.1.1 Performance Indicator: Students will state school policies regarding shop procedures and general safety precautions regarding the shop.

1.1.2 Performance Indicator: Students will sign a shop policy and procedures statement with parents and submit to the teacher.

1.1.3 Performance Indicator: Students will safely adjust, maintain, and operate various types of power equipment.

1.1.4 Performance Indicator: Students will use operator’s manuals to develop service schedules and keep maintenance records.

Standard 2 – Students learn personal safety in agricultural mechanics.

2.1 Objective: Interpret safety colors and codes, protect the body against injury, and work safely in agricultural mechanics settings.

2.1.1 Performance Indicator: Students will state how to create a safe place to work.

2.1.2 Performance Indicator: Students will recognize hazards in agricultural mechanics.

2.1.3 Performance Indicator: Students will list the types of parts and areas identified by various safety colors.

2.1.4 Performance Indicator: Students will describe what each safety color means.

Standard 3 – Students learn shop cleanup and organization.

3.1 Objective: Work cooperatively with classmates to clean the shop efficiently and store all tools and materials.

3.1.1 Performance Indicator: Students will use shop-cleaning equipment properly.

3.1.2 Performance Indicator: Students will clean benches, machines, and floors.

3.1.3 Performance Indicator: Students will store materials and tools properly.

3.1.4 Performance Indicator: Students will do assigned tasks.

3.1.5 Performance Indicator: Students will work cooperatively with others.

Standard 4 – Students learn Future Farmers of America (FFA) leadership skills.

4.1 Objective: Develop the student's potential for premier leadership, personal growth, and career success.

4.1.1 Performance Indicator: Students will strengthen the confidence in themselves and their work.

4.1.2 Performance Indicator: Students will encourage wise management of resources.

4.1.3 Performance Indicator: Students will develop interpersonal skills through team competitions.

4.1.4 Performance Indicator: Students will build character and promote citizenship, volunteerism, and patriotism.

4.1.5 Performance Indicator: Students will promote excellence and healthy lifestyles.

Standard 5 – Students learn to use gas welding equipment.

5.1 Objective: Use heating, cutting, and gas welding equipment safely.

5.1.1 Performance Indicator: Identify major parts of propane and oxyacetylene welding equipment.

5.1.2 Performance Indicator: Students will turn on and adjust oxyacetylene controls.

5.1.3 Performance Indicator: Students will light and adjust oxyacetylene torches.

5.1.4 Performance Indicator: Students will shut off and bleed oxyacetylene equipment.

Standard 6 – Students learn to cut with oxyfuels.

6.1 Objective: Use oxygen and selected fuels to cut steel with a flame torch.

6.1.1 Performance Indicator: Students will write the names and characteristics of common fuels used for cutting.

6.1.2 Performance Indicator: Students will state and apply recommended safety practices for using oxyfuels.

6.1.3 Performance Indicator: Students will select appropriate pressures for using oxygen and common fuel gases.

6.1.4 Performance Indicator: Students will cut steel with oxyfuels.

6.1.5 Performance Indicator: Students will pierce steel with oxyfuels.

Standard 7 – Students learn brazing and welding with oxyacetylene.

7.1 Objective: Braze and weld safely with oxyacetylene equipment.

7.1.1 Performance Indicator: Students will explain the nature and uses of braze welding.

7.1.2 Performance Indicator: Students will prepare metal and flux for welding.

7.1.3 Performance Indicator: Students will identify joints commonly used in welding.

7.1.4 Performance Indicator: Students will braze and braze weld butt, lap, and fillet joints.

7.1.5 Performance Indicator: Students will fuse mild steel with and without filler rod.

Standard 8 – Students learn to identify, mark, cut, and bend metal.

8.1 Objective: Identify, mark, cut, and bend cold metal.

8.1.1 Performance Indicator: Students will identify metals.

8.1.2 Performance Indicator: Students will mark metal.

8.1.3 Performance Indicator: Students will cut and file metal.

8.1.4 Performance Indicator: Students will bend square, round, and flat steel.

8.1.5 Performance Indicator: Students will form sheet metal.

Standard 9 – Students learn to fasten metal.

9.1 Objective: Fasten metals using procedures common in agricultural mechanics.

9.1.1 Performance Indicator: Students will drill holes in metal.

9.1.2 Performance Indicator: Students will tap threads in holes.

9.1.3 Performance Indicator: Students will cut threads on bolts and pipe.

9.1.4 Performance Indicator: Students will fasten metal with bolts, screws, and rivets.

9.1.5 Performance Indicator: Students will solder sheet metal.

9.1.6 Performance Indicator: Students will sweat copper pipe.

Standard 10 – Students learn to use portable power tools.

10.1 Objective: Select and safely use major portable power tools.

10.1.1 Performance Indicator: Students will state recommended procedures for using portable power tools.

10.1.2 Performance Indicator: Students will write a description of the uses of common portable power tools.

10.1.3 Performance Indicator: Students will identify and spell the names of the major parts of portable power tools.

10.1.4 Performance Indicator: Students will safely operate a portable power drill, belt sander, disc sander/grinder, finishing sanders, saber saw, and circular saw.

Standard 11 – Students learn to adjust and maintain power equipment.

11.1 Objective: Properly adjust stationary power machines to achieve the most efficiency and create the safest working conditions.

11.1.1 Performance Indicator: Students will state the safety precautions one should take in adjusting stationary power machines.

11.1.2 Performance Indicator: Students will discuss why it is important to maintain the proper adjustments on stationary machines.

11.1.3 Performance Indicator: Students will list adjustable parts of the following equipment: band saw, table saw, radial arm saw, drill press, jointer, and planer.

Standard 12 – Students learn metalworking with power machines.

12.1 Objective: Safely use stationary power machines for metal working.

12.1.1 Performance Indicator: Students will state the basic procedures for using stationary machines for metal working.

12.1.2 Performance Indicator: Students will identify and properly spell major parts of specified machines.

12.1.3 Performance Indicator: Students will operate the following: drill press, grinder, power metal-cutting saws, power shear, and metal bender, metal lathe.

Standard 13 – Students sketch and draw projects.

13.1 Objective: Use simple drawing techniques to create plans for personal projects.

13.1.1 Performance Indicator: Students will identify common drawing equipment.

13.1.2 Performance Indicator: Students will match basic drawing symbols with their definitions.

13.1.3 Performance Indicator: Students will distinguish between pictorial and three-view drawings.

13.1.4 Performance Indicator: Students will read and interpret a drawing.

13.1.5 Performance Indicator: Students will make a three view drawing of a given object.

Standard 14 – Students learn to figure a bill of materials.

14.1 Objective: State the use and format of a bill of materials and make all calculations needed to develop a bill of materials.

14.1.1 Performance Indicator: Students will define terms associated with a bill of materials.

14.1.2 Performance Indicator: Students will state the components of a bill of materials.

14.1.3 Performance Indicator: Students will record dimensions of structural metals and lumber.

14.1.4 Performance Indicator: Students will calculate board feet.

14.1.5 Performance Indicator: Students will calculate costs included in a bill of materials.

14.1.6 Performance Indicator: Students will prepare a written bill of materials.

Standard 15 – Students select, plan, and build a project.

15.1 Objective: Select and plan projects that develop the wood working and metal working skills needed in agricultural jobs.

15.1.1 Performance Indicator: Students will determine the students' existing skills in agricultural mechanics.

15.1.2 Performance Indicator: Students will select projects that require the use of wood working tools.

15.1.3 Performance Indicator: Students will select projects that require the use of metal working tools.

15.1.4 Performance Indicator: Students will select projects that are appropriate for developing basic skills.

15.1.5 Performance Indicator: Students will modify plans of projects to meet personal needs.

Standard 16 – Students learn record keeping.

16.1 Objective: Understand the principles of good records and maintain a record of the Supervised Agriculture Experience Program (project).

16.1.1 Performance Indicator: Students will describe the uses of planning and historical calendars.

16.1.2 Performance Indicator: Students will write a project contract.

16.1.3 Performance Indicator: Students will maintain an ongoing project journal.

Standard 17 – Students select and use arc welding equipment.

17.1 Objective: Select electric arc welders, equipment, and materials needed for welding in agricultural mechanics.

17.1.1 Performance Indicator: Students will describe the shielded metal arc welding process.

17.1.2 Performance Indicator: Students will distinguish types of electric welding machines.

17.1.3 Performance Indicator: Students will select suitable supplies and equipment for shielded metal arc welding.

17.1.4 Performance Indicator: Students will recognize color and numeral markings on electrodes.

Standard 18 – Students use arc welding mild steel and Metal Inert Gas and Tungsten Inert Gas (MIG and TIG) welding.

18.1 Objective: Use arc welding equipment and procedures in cutting and welding.

18.1.1 Performance Indicator: Students will use safety equipment and protective clothing for arc welding.

18.1.2 Performance Indicator: Students will strike an arc and run beads.

18.1.3 Performance Indicator: Students will make butt and fillet welds.

18.1.4 Performance Indicator: Students will make flat, horizontal, and vertical welds.

18.1.5 Performance Indicator: Students will weld pipe.

18.1.6 Performance Indicator: Students will identify major parts of MIG and TIG welding outfits.

18.1.7 Performance Indicator: Students will explain and do MIG and TIG welding.

18.1.8 Performance Indicator: Students will identify major parts of a spot welder.

18.1.9 Performance Indicator: Students will demonstrate use of a spot welder.

Standard 19 – Students learn to prepare wood and metal for painting.

19.1 Objective: Prepare wood and metal for painting.

19.1.1 Performance Indicator: Students will prepare unpainted wood for painting.

19.1.2 Performance Indicator: Students will prepare previously painted wood surface for repainting.

19.1.3 Performance Indicator: Students will prepare unpainted metal for painting.

19.1.4 Performance Indicator: Students will remove rust and scale from metal surfaces.

19.1.5 Performance Indicator: Students will mask machinery for spray painting.

19.1.6 Performance Indicator: Students will estimate materials for paint jobs.

19.1.7 Performance Indicator: Students will paint buildings and machinery.

Standard 20 – Students select and apply paint materials.

20.1 Objective: Select and apply paint in agricultural settings.

20.1.1 Performance Indicator: Students will name major types of paint and paint components.

20.1.2 Performance Indicator: Students will select paint for wood and metal.

20.1.3 Performance Indicator: Students will apply paint with brushes.

20.1.4 Performance Indicator: Students will spray paint with aerosol containers.

20.1.5 Performance Indicator: Students will select and use spray-painting equipment.

20.1.6 Performance Indicator: Students will clean painting equipment.

Standard 21 – Students learn the diesel engine fundamentals.

21.1 Objective: Explain how diesel engines work.

21.1.1 Performance Indicator: Students will explain why most modern farm machinery is powered by diesel engines.

21.1.2 Performance Indicator: Students will explain how diesel engines work.

21.1.3 Performance Indicator: Students will list the systems of a modern tractor.

21.1.4 Performance Indicator: Students will discuss the principles of tractor maintenance.

Standard 22 – Students install branch circuits.

22.1 Objective: Run wires and safely install boxes, switches, outlets, and fixtures.

22.1.1 Performance Indicator: Students will select electrical boxes, outlets, and switchers.

22.1.2 Performance Indicator: Students will install and replace switches, outlets, and fixtures.

22.1.3 Performance Indicator: Students will install, extend, and modify branch circuits.

22.1.4 Performance Indicator: Students will test electric circuits.

Standard 23 – Students learn about electronics in agriculture.

23.1 Objective: Utilize electronic principles and applications in agricultural settings.

23.1.1 Performance Indicator: Students will cite the major historical landmarks in electronics development.

23.1.2 Performance Indicator: Students will state basic principles of electronics.

23.1.3 Performance Indicator: Students will name typical applications of electronics in agriculture.

23.1.5 Performance Indicator: Students will discuss strategies for maintaining electronics equipment.

Standard 24 – Students learn to work with electric motors, drives, and controls.

24.1 Objective: Install, maintain, and utilize motors and controls.

24.1.1 Performance Indicator: Students will list advantages of electric motor power.

24.1.2 Performance Indicator: Students will discuss the types of electric motors.

24.1.3 Performance Indicator: Student will list factors to consider with selecting motors.

24.1.4 Performance Indicator: Students will discuss mounts and drives for motors.

24.1.5 Performance Indicator: Students will select and use motor controls.

24.1.6 Performance Indicator: Students will maintain motors and controls.

Standard 25 – Students learn about hydraulic, pneumatic, and robotic power.

25.1 Objective: To maintain and utilize fluid and robotic power.

25.1.1 Performance Indicator: Students will compare hydraulic and pneumatic systems.

25.1.2 Performance Indicator: Students will identify basic theories applying to fluid dynamics.

25.1.3 Performance Indicator: Students will describe fluid power principles.
25.1.4 Performance Indicator: Students will discuss fluid characteristics.

25.1.5 Performance Indicator: Students will identify major components of fluid systems.

25.1.6 Performance Indicator: Students will use and maintain fluid power equipment.

25.1.7 Performance Indicator: Students will discuss some principles of robotics.

Standard 26 – Students plan and construct agricultural structures.

26.1 Objective: Plan and construct agricultural structures.

26.1.1 Performance Indicator: Students will discuss appropriate considerations for site planning.

26.1.2 Performance Indicator: Students will determine storage space requirements for farm machinery.

26.1.3 Performance Indicator: Students will identify major types of buildings used in agricultural settings.

26.1.4 Performance Indicator: Students will demonstrate surveying principles and survey instrument adjustment

26.1.5 Performance Indicator: Students will participate in land measurement activities.

26.1.6 Performance Indicator: Students will name major building parts.

26.1.7 Performance Indicator: Students will describe features used to make buildings waterproof and wind-resistant.

26.1.8 Performance Indicator: Students will construct and maintain agricultural buildings.

26.1.9 Performance Indicator: Students will insulate agriculture structures.

Standard 27 – Students learn about aquaculture, greenhouse, and hydroponics structures.

27.1 Objective: Build and maintain structures for aquaculture, greenhouse, and hydroponics management.

27.1.1 Performance Indicator: Students will recognize structures used for aquaculture, greenhouses, and hydroponics.

27.1.2 Performance Indicator: Students will construct and maintain simple production facilities.

Standard 28 – Students learn fence design and construction.

28.1 Objective: Identify the main types of fences and explain how fences are constructed.

28.1.1 Performance Indicator: Students will discuss why humans have built fences for thousands of years.

28.1.2 Performance Indicator: Students will identify the various types of fences used today.

28.1.3 Performance Indicator: Students will discuss the various types of materials used in modern fences.

28.1.4 Performance Indicator: Students will explain the safety rules used in fencing.

28.1.5 Performance Indicator: Students will explain the proper methods used in building fences.