Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

Cluster Title: Agricultural Mechanics
Cluster Type: Job Preparatory
Occupational Area: Agriscience and Natural Resources
Components: Three Programs, One Core, and Five Occupational Completion Points

	Secondary	PSAV
Grade Level	9-12, 30, 31	30, 31
Facility Code	204	204
CTSO	FFA	PAS
Coop Method	Yes	Yes
Apprenticeship	Yes	Yes

I. **PURPOSE:** The purpose of the programs in this cluster is to prepare students for employment or advanced training in agricultural mechanics and the agricultural machinery services and operations industry.

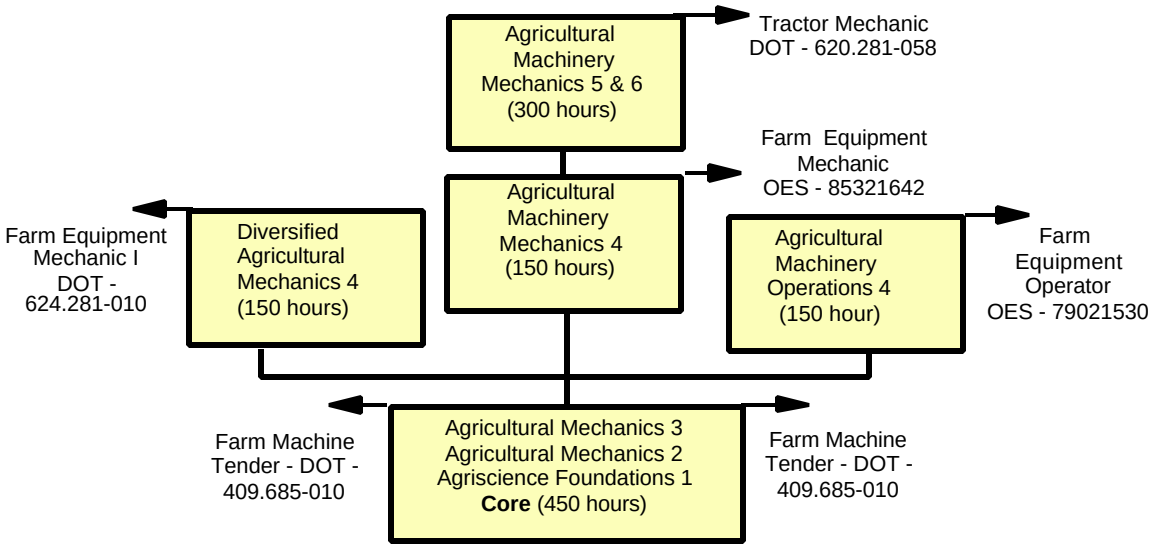
This cluster of programs focuses on broad, transferable skills, stresses the understanding of all aspects of the agricultural mechanics industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. **CLUSTER STRUCTURE:** This cluster is a planned sequence of instruction consisting of three programs with one common core and five occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue in the training program or become an occupational completer.

It is recommended that students complete the core or demonstrate a mastery of the student performance standards contained in the core before advancing to the course(s) in the next level of any of the three programs: Agricultural Machinery Mechanics, Agricultural Machinery Operations and Diversified Agricultural Mechanics.

The following diagram illustrates the **CLUSTER STRUCTURE:**

AGRICULTURAL MECHANICS CLUSTER



At the secondary level, this cluster of programs consists of the following courses, which includes the core:

AGRICULTURAL MACHINERY MECHANICS PROGRAM - 6 secondary credits

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FARM MACHINE TENDER - DOT Code 409.685-010 (CORE)

8106810 - Agriscience Foundations 1
8103120 - Agricultural Mechanics 2
8103130 - Agricultural Mechanics 3

OCCUPATIONAL COMPLETION POINT - DATA CODE B
FARM EQUIPMENT MECHANIC - OES Code 85321642

8103410 - Agricultural Machinery Mechanics 4

OCCUPATIONAL COMPLETION POINT - DATA CODE C
TRACTOR MECHANIC - DOT Code 620.281-058

8103420 - Agricultural Machinery Mechanics 5
8103430 - Agricultural Machinery Mechanics 6

AGRICULTURAL MACHINERY OPERATIONS PROGRAM - 4 secondary credits

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FARM MACHINE TENDER - DOT Code 409.685-010 (CORE)

8106810 - Agriscience Foundations 1
8103120 - Agricultural Mechanics 2

8103130 - Agricultural Mechanics 3

OCCUPATIONAL COMPLETION POINT - DATA CODE B
FARM EQUIPMENT OPERATOR - OES Code 79021530

8103210 - Agricultural Machinery Operations 4

DIVERSIFIED AGRICULTURAL MECHANICS PROGRAM - 4 secondary credits

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FARM MACHINE TENDER - DOT Code 409.685-010 (CORE)

8106810 - Agriscience Foundations 1
8103120 - Agricultural Mechanics 2
8103130 - Agricultural Mechanics 3

OCCUPATIONAL COMPLETION POINT - DATA CODE B
FARM EQUIPMENT MECHANIC - OES Code 85321642

8103310 - Diversified Agricultural Mechanics 4

III. **SPECIAL NOTE:** FFA (for secondary) and the National Postsecondary Agricultural Student Organization (for postsecondary) are the appropriate Career Technical Student Organizations for providing leadership training and for reinforcing specific vocational skills. Career Technical Student Organizations, when provided, shall be an integral part of the curriculum in accordance with Rule 6A-6.065, FAC.

Classroom and laboratory activities are an integral part of this cluster. These activities include instruction in the use of the safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation. A generic equipment list is available for the programs in this cluster.

The programs in this cluster may be offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

Planned and supervised instructional activities must be provided through one or more of the following: (1) directed laboratory experience, (2) student projects, (3) placement for experience, (4) cooperative experience.

Cooperative training - OJT is appropriate for this program. Whenever cooperative training - OJT is offered, the following are required for each student: a training plan, signed by the student, teacher, and employer, which includes instructional objectives and a list of on-the-job and in-school learning experiences; a workstation that reflects equipment, skills, and tasks that are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed before the intended outcomes for the program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion from the program, remediation should be provided concurrently in Vocational Instruction Preparation (VIP). Please reference the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit, must be specified on an individual basis. The job or jobs for which the student is being trained should be reflected in the student's desired post school outcome statement on the Transition Individual Educational Plan (Transition IEP).

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this cluster must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Agricultural Machinery Mechanics

	Secondary	PSAV
Program Number	**8103400**	**A010240**
CIP Number	0101.020410	0101.020410
Grade Level	9-12, 30, 31	30, 31
Standard Length	6 credits	900 hours
Certification	VOC AGRI @4	VOC AGRI @4
	AGRI @4	AGRI @2 @4
	AGRI MECH #7	AGRI MECH @7 G
	AGRICULTUR 1 @2	AGRICULTUR 1 @2
Basic-Skills Grade Level		
	Math	9
	Language	9
	Reading	9

INTENDED OUTCOMES: After successfully completing the appropriate outcomes for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FARM MACHINE TENDER - DOT Code 409.685-010 (CORE)

01.0 Describe the socioeconomic role of the agricultural industry.
02.0 Apply scientific and technological principles to the agricultural industry.
03.0 Practice agricultural safety.
04.0 Demonstrate the use of tools, equipment, and instruments in the agricultural industry.
05.0 Describe the principles of integrated pest management (IPM).
06.0 Describe the principles of plant and/or animal growth and reproduction.
07.0 Apply business skills and economic principles to the agricultural industry.
08.0 Explain the basic marketing processes in the agricultural industry.
09.0 Demonstrate human-relations, communications, and leadership skills.
10.0 Practice personal, equipment, and shop safety.
11.0 Select and use hand and power tools.
12.0 Install simple electrical circuits.
13.0 Demonstrate electric and gas welding.
14.0 Service and maintain small gasoline engines.
15.0 Perform preventive maintenance, checks, and services for tractors.
16.0 Perform minor repairs on an irrigation system.
17.0 Apply basic financial-management skills.
18.0 Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
FARM EQUIPMENT MECHANIC - OES Code 85321642

19.0 Keep records.

20.0 Weld, braze, and cut, using appropriate equipment.
21.0 Operate, service, test, and maintain agricultural machinery and equipment.
22.0 Demonstrate positive customer-relations skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE C

TRACTOR MECHANIC - DOT Code 620.281-058

23.0 Diagnose, service, and repair the lubrication system.
24.0 Test, repair and/or replace, and maintain the cooling system.
25.0 Test, repair and/or replace the intake, exhaust, and turbo-charged systems.
26.0 Test, repair and/or replace the fuel-delivery system.
27.0 Test, repair and/or replace, and maintain the brake system.
28.0 Test, repair and/or replace internal-combustion engines.
29.0 Test, repair and/or replace the electrical system, using service manuals.
30.0 Diagnose, service, and repair transmission systems.
31.0 Service and repair transfer case.
32.0 Diagnose, service, repair, and maintain the hydraulic system.
33.0 Diagnose, service, and repair the final drive systems.
34.0 Apply business-management skills and identify appropriate legal documents.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Agricultural Machinery Mechanics
Secondary Number: 8103400
Postsecondary Number: A010240

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FARM MACHINE TENDER - DOT Code 409.685-010 (CORE)

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.
- 02.12 Explain the flow of energy from the sun through agricultural systems.
- 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
- 02.14 Apply principles of waste management to environmental problems common to agricultural systems.

02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).

03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:

03.01 List the most common causes of agricultural accidents.
03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
03.04 Describe symptoms of pesticide poisoning.
03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
03.06 Select, mix, and apply a nonrestricted chemical, according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
03.08 Identify the proper disposal of containers and residual pesticides.
03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).

04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:

04.01 Choose the proper tools, equipment, and instruments for a specific job.
04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
04.04 Demonstrate the ability to use an equipment manual.
04.05 Demonstrate the use of selected tools, equipment, and instruments.
04.06 Service, maintain, and store tools, equipment, instruments, and supplies.

05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:

05.01 Identify types of pests and beneficials.
05.02 Identify and select an appropriate control for each type of pest and/or weed.
05.03 Describe the principles and benefits of integrated pest management.

06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:

For plant:

06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
06.03 Propagate plants through sexual and asexual means.
06.04 Identify the nutrients required for plant growth and development and the role of each.
06.05 Extract pertinent information from a fertilizer label.

For animal:

06.07 Identify the nutrients required for animal growth and development and the role of each.
06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

07.01 Explain the basic economic principles in the agricultural industry.
07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
07.04 Select and use computer applications.
07.05 Analyze and interpret agribusiness data.
07.06 Keep and maintain supervised agricultural experience (SAE) records.
07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

08.01 Describe key factors in marketing agricultural products.
08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

09.01 Demonstrate acceptable work habits and attitudes.
09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
09.03 Communicate effectively in verbal, written, and nonverbal modes.
09.04 Recognize and demonstrate good listening skills.
09.05 Conduct small informal and formal group meetings.

09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
09.07 Recognize and demonstrate communications skills in the workplace.
09.08 Demonstrate effective telephone skills.

10.0 PRACTICE PERSONAL, EQUIPMENT, AND SHOP SAFETY--The student will be able to:

10.01 Identify and eliminate hazards in agricultural mechanics settings.
10.02 Observe color-coded warnings in work areas and on equipment and machinery.
10.03 Describe appropriate actions in case of fire, accident, or other emergencies.
10.04 Describe personal protective equipment (PPE) and appropriate clothing.
10.05 Demonstrate safety procedures and workplace "housekeeping" practices.
10.06 Safely handle and store flammable and non-restricted chemicals.
10.07 Operate machinery and equipment according to the safety recommendations of the manufacturers.
10.08 Comply with the Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) rules and regulations.
10.09 Describe the Florida "Right-to-Know" law (as recorded in Florida Statutes, Chapter 442).

11.0 SELECT AND USE HAND AND POWER TOOLS--The student will be able to:

11.01 Identify the capabilities and limitations of hand and power tools.
11.02 Select and safely use hand and power tools.
11.03 Select and use proper PPE for hand and power tools.
11.04 Identify worn, damaged, or abused tools.
11.05 Select and demonstrate the appropriate procedures for sharpening tools.

12.0 INSTALL SIMPLE ELECTRICAL CIRCUITS--The student will be able to:

12.01 Demonstrate the principles of AC and DC circuitry.
12.02 Demonstrate series and parallel circuitry.
12.03 Explain the scientific principles of electrical systems.
12.04 Plan and install a simple wiring system.
12.05 Test electrical circuits.

13.0 DEMONSTRATE ELECTRIC AND GAS WELDING--The student will be able to:

13.01 Select and use gas-welding equipment.
13.02 Select and use electric arc-welding equipment and materials.

14.0 SERVICE AND MAINTAIN SMALL GASOLINE ENGINES--The student will be able to:

14.01 Explain the scientific principles of small engines.
14.02 Identify major parts and describe the general operation of small gasoline engines (2- and 4-stroke cycle).
14.03 Practice appropriate safety precautions.
14.04 Troubleshoot and perform minor repairs on small gasoline engines.

15.0 PERFORM PREVENTIVE MAINTENANCE, CHECKS, AND SERVICES FOR TRACTORS--The student will be able to:

15.01 Explain the scientific principles of hydraulic and transmission systems.
15.02 Perform daily operator maintenance checks for tractors.
15.03 Determine the preventive-maintenance procedures, using the tractor operator's manual.
15.04 Perform scheduled preventive-maintenance procedures.
15.05 Interpret and perform operator's trouble-shooting procedures as described in the manual.
15.06 Keep records of tractor maintenance and services.

16.0 PERFORM MINOR REPAIR ON AN IRRIGATION SYSTEM--The student will be able to:

16.01 Identify the basic components of irrigation systems.
16.02 Differentiate various types of irrigation systems.
16.03 Identify state and local regulatory agencies for water management.
16.04 Perform minor repair on an irrigation system.

17.0 APPLY BASIC FINANCIAL-MANAGEMENT SKILLS--The student will be able to:

17.01 Complete basic financial records.
17.02 Demonstrate the use of banking procedures.
17.03 Calculate interest on loans.
17.04 Complete selected income-tax-return forms.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct group meetings, using parliamentary procedures and public-speaking skills.
18.02 Identify the documents that are required for a job application.
18.03 Complete a job application form.
18.04 Demonstrate competencies in job-interview techniques.
18.05 Demonstrate knowledge of how to make job changes appropriately.
18.06 Demonstrate acceptable personal hygiene and a professional appearance.
18.07 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
18.08 Describe the importance of a drug-free workplace and the industry policies regarding alcohol and drug use.
18.09 Demonstrate appropriate responses to performance evaluation from employer, supervisor, or other persons in the workplace.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

FARM EQUIPMENT MECHANIC - OES Code 85321642

19.0 KEEP RECORDS--The student will be able to:

- 19.01 Explain the purpose and importance of keeping records.
- 19.02 Demonstrate procedures for keeping records of equipment maintenance and services.
- 19.03 Keep records on each job or project assignment.
- 19.04 Complete work orders, service invoices, and requisitions.
- 19.05 Prepare a written cost estimate of repair work and warranty claims.

20.0 WELD, BRAZE, AND CUT, USING APPROPRIATE EQUIPMENT--The student will be able to:

- 20.01 Set up, adjust, operate, and maintain MIG (middle inert gas) and TIG (tungsten inert gas) welding equipment.
- 20.02 Set up, adjust, and operate plasma cutting equipment.
- 20.03 Select recommended operational procedures and supplies for specific jobs.
- 20.04 Practice all recommended safety precautions.
- 20.05 Demonstrate the different welding positions.
- 20.06 Cut and pierce metals, using oxyacetylene and plasma.
- 20.07 Braze metals.
- 20.08 Apply hard-surface alloys.
- 20.09 Store welding equipment and supplies according to the recommended storage procedures.

21.0 OPERATE, SERVICE, TEST, AND MAINTAIN AGRICULTURAL MACHINERY AND EQUIPMENT--The student will be able to:

- 21.01 Operate and adjust agricultural machinery and equipment that are used in the local area, according to the operator's manuals, such as the following:
  - a. agricultural wheel-type tractors
  - b. planting equipment
  - c. primary and secondary tillage equipment
  - d. pesticide-application equipment
  - e. harvesting equipment
  - f. fertilization equipment
- 21.02 Remove, clean, test, repair, and reinstall parts of machinery and equipment, using repair manuals.
- 21.03 Service machinery, using service manuals.
- 21.04 Follow safety precautions when operating, servicing, and maintaining machines and equipment.

22.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

- 22.01 Exercise self-control.
- 22.02 Identify and demonstrate appropriate responses to criticism.
- 22.03 Explain the effects of positive human-relations skills on success in the business.

22.04 Demonstrate respect for people and property.

OCCUPATIONAL COMPLETION POINT - DATA CODE C

TRACTOR MECHANIC - DOT Code 620.281-058

23.0 DIAGNOSE, SERVICE, AND REPAIR THE LUBRICATION SYSTEM--The student will be able to:

23.01 Change oil filters.
23.02 Check and change oils and other lubricants in engines.
23.03 Diagnose and replace damaged or worn components of the system.

24.0 TEST, REPAIR AND/OR REPLACE, AND MAINTAIN THE COOLING SYSTEM--The student will be able to:

24.01 Test coolant.
24.02 Flush and clean the system.
24.03 Test, repair and/or replace parts of the system.
24.04 Adjust parts of the system for proper operation.

25.0 TEST, REPAIR AND/OR REPLACE THE INTAKE, EXHAUST, AND TURBO-CHARGED SYSTEMS--The student will be able to:

25.01 Troubleshoot the intake, exhaust, and turbo-charged systems, using recommended diagnostic equipment.
25.02 Repair and replace parts of the systems.
25.03 Service and adjust the systems for proper operation.

26.0 TEST, REPAIR AND/OR REPLACE THE FUEL-DELIVERY SYSTEM, USING SERVICE MANUALS--The student will be able to:

26.01 Remove, clean, rebuild, and reinstall carburetors.
26.02 Bleed the diesel-fuel system.
26.03 Remove and reinstall a diesel-fuel-injection pump, according to the manufacturer's specifications.
26.05 Replace components of the fuel system.
26.06 Service and adjust parts of the fuel system for proper operation.

27.0 TEST, REPAIR AND/OR REPLACE, AND MAINTAIN THE BRAKE SYSTEM--The student will be able to:

27.01 Drain, refill, and adjust the brake system.
27.02 Test brake-system components, using recommended diagnostic equipment.
27.03 Repair and replace parts of the system.
27.04 Service and adjust the system for proper operation.

28.0 TEST, REPAIR AND/OR REPLACE INTERNAL-COMBUSTION ENGINES--The student will be able to:

28.01 Troubleshoot components of the engine, using recommended diagnostic equipment.

28.02 Repair and replace components of the basic engine, using repair manuals.
28.03 Service and adjust all parts of the engine for proper operation.

29.0 TEST, REPAIR AND/OR REPLACE THE ELECTRICAL SYSTEM, USING SERVICE MANUALS--The student will be able to:

29.01 Troubleshoot the electrical system, using recommended diagnostic equipment.
29.02 Repair and replace components of the electrical system.
29.03 Service and adjust all parts of the system for proper operation.

30.0 DIAGNOSE, SERVICE, AND REPAIR TRANSMISSION SYSTEMS--The student will be able to:

30.01 Troubleshoot transmission components, using recommended diagnostic equipment.
30.02 Repair and replace parts of transmission systems.
30.03 Service and adjust parts of different transmission systems for proper operation.

31.0 SERVICE AND REPAIR TRANSFER CASE--The student will be able to:

31.01 Troubleshoot transfer case components.
31.02 Service and adjust system components.
31.03 Repair and replace system components.
31.04 Change filters and drain, flush, and refill the transfer case system.

32.0 DIAGNOSE, SERVICE, REPAIR, AND MAINTAIN THE HYDRAULIC SYSTEM--The student will be able to:

32.01 Change filters and drain, flush, and refill the hydraulic system.
32.02 Troubleshoot hydraulic-system components, using recommended diagnostic equipment.
32.03 Repair and replace parts of the system.
32.04 Service and adjust the system for proper operation.

33.0 DIAGNOSE, SERVICE, AND REPAIR THE FINAL-DRIVE SYSTEMS--The student will be able to:

33.01 Diagnose the final-drive systems, using recommended diagnostic equipment.
33.02 Repair and replace parts of the systems.
33.03 Service and adjust the systems for proper operation.

34.0 APPLY BUSINESS-MANAGEMENT SKILLS AND IDENTIFY APPROPRIATE LEGAL DOCUMENTS--The student will be able to:

34.01 Identify personal/business liability and the use of liability insurance.

34.02 Identify applicable insurance requirements.
34.03 Identify and complete basic business-tax-liability forms.
34.04 Identify the requirements of greenbelt, bluebelt, and homestead tax exemptions.
34.05 Interpret enterprise budgets and amortization tables.
34.06 Identify characteristics of legal documents (such as contracts, deeds, and leases).
34.07 Identify applicable land-use and zoning regulations, including a comprehensive plan.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8106810
Course Title: Agriscience Foundations I
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as a core and is designed to develop competencies in the areas of agricultural history; global importance of agriculture; career opportunities; applied scientific and technological concepts; ecosystems; agricultural safety; principles of integrated pest management; principles of plant and animal growth; economic principles; agricultural marketing; and human relations skills.

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.

02.12 Explain the flow of energy from the sun through agricultural systems.
02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
02.14 Apply principles of waste management to environmental problems common to agricultural systems.
02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).

03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:

03.01 List the most common causes of agricultural accidents.
03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
03.04 Describe symptoms of pesticide poisoning.
03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
03.06 Select, mix, and apply a nonrestricted chemical, according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
03.08 Identify the proper disposal of containers and residual pesticides.
03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).

04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:

04.01 Choose the proper tools, equipment, and instruments for a specific job.
04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
04.04 Demonstrate the ability to use an equipment manual.
04.05 Demonstrate the use of selected tools, equipment, and instruments.
04.06 Service, maintain, and store tools, equipment, instruments, and supplies.

05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:

05.01 Identify types of pests and beneficials.
05.02 Identify and select an appropriate control for each type of pest and/or weed.

05.03 Describe the principles and benefits of integrated pest management.

06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:

For plant:

06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
06.03 Propagate plants through sexual and asexual means.
06.04 Identify the nutrients required for plant growth and development and the role of each.
06.05 Extract pertinent information from a fertilizer label.

For animal:

06.07 Identify the nutrients required for animal growth and development and the role of each.
06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

07.01 Explain the basic economic principles in the agricultural industry.
07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
07.04 Select and use computer applications.
07.05 Analyze and interpret agribusiness data.
07.06 Keep and maintain supervised agricultural experience (SAE) records.
07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

08.01 Describe key factors in marketing agricultural products.
08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

09.01 Demonstrate acceptable work habits and attitudes.
09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.

09.03 Communicate effectively in verbal, written, and nonverbal modes.
09.04 Recognize and demonstrate good listening skills.
09.05 Conduct small informal and formal group meetings.
09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
09.07 Recognize and demonstrate communications skills in the workplace.
09.08 Demonstrate effective telephone skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8103120
Course Title: Agricultural Mechanics 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of safety; selection and use of tools; electrical circuits; and employability skills.

10.0 PRACTICE PERSONAL, EQUIPMENT, AND SHOP SAFETY--The student will be able to:

- 10.01 Identify and eliminate hazards in agricultural mechanics settings.
- 10.02 Observe color-coded warnings in work areas and on equipment and machinery.
- 10.03 Describe appropriate actions in case of fire, accident, or other emergencies.
- 10.04 Describe personal protective equipment (PPE) and appropriate clothing.
- 10.05 Demonstrate safety procedures and workplace "housekeeping" practices.
- 10.06 Safely handle and store flammable and non-restricted chemicals.
- 10.07 Operate machinery and equipment according to the safety recommendations of the manufacturers.
- 10.08 Comply with the Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) rules and regulations.
- 10.09 Describe the Florida "Right-to-Know" law (as recorded in Florida Statutes, Chapter 442).

11.0 SELECT AND USE HAND AND POWER TOOLS--The student will be able to:

- 11.01 Identify the capabilities and limitations of hand and power tools.
- 11.02 Select and safely use hand and power tools.
- 11.03 Select and use proper PPE for hand and power tools.
- 11.04 Identify worn, damaged, or abused tools.
- 11.05 Select and demonstrate the appropriate procedures for sharpening tools.

12.0 INSTALL SIMPLE ELECTRICAL CIRCUITS--The student will be able to:

- 12.01 Demonstrate the principles of AC and DC circuitry.
- 12.02 Demonstrate series and parallel circuitry.
- 12.03 Explain the scientific principles of electrical systems.

12.04 Plan and install a simple wiring system.
12.05 Test electrical circuits.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct group meetings, using parliamentary procedures and public-speaking skills.
18.02 Identify the documents that are required for a job application.
18.03 Complete a job application form.
18.04 Demonstrate competencies in job-interview techniques.

Program: 8103400 Agricultural Machinery Mechanics July 2001

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8103130
Course Title: Agricultural Mechanics 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of welding; small gasoline engine service and repair; preventative maintenance procedures; irrigation system repair; financial management skills and employability skills.

13.0 DEMONSTRATE ELECTRIC AND GAS WELDING--The student will be able to:

13.01 Select and use gas-welding equipment.
13.02 Select and use electric arc-welding equipment and materials.

14.0 SERVICE AND MAINTAIN SMALL GASOLINE ENGINES--The student will be able to:

14.01 Explain the scientific principles of small engines.
14.02 Identify major parts and describe the general operation of small gasoline engines (2- and 4-stroke cycle).
14.03 Practice appropriate safety precautions.
14.04 Troubleshoot and perform minor repairs on small gasoline engines.

15.0 PERFORM PREVENTIVE MAINTENANCE, CHECKS, AND SERVICES FOR TRACTORS--The student will be able to:

15.01 Explain the scientific principles of hydraulic and transmission systems.
15.02 Perform daily operator maintenance checks for tractors.
15.03 Determine the preventive-maintenance procedures, using the tractor operator's manual.
15.04 Perform scheduled preventive-maintenance procedures.
15.05 Interpret and perform operator's trouble-shooting procedures as described in the manual.
15.06 Keep records of tractor maintenance and services.

16.0 PERFORM MINOR REPAIR ON AN IRRIGATION SYSTEM--The student will be able to:

16.01 Identify the basic components of irrigation systems.
16.02 Differentiate various types of irrigation systems.
16.03 Identify state and local regulatory agencies for water management.
16.04 Perform minor repair on an irrigation system.

17.0 APPLY BASIC FINANCIAL-MANAGEMENT SKILLS--The student will be able to:

17.01 Complete basic financial records.
17.02 Demonstrate the use of banking procedures.
17.03 Calculate interest on loans.
17.04 Complete selected income-tax-return forms.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.05 Demonstrate knowledge of how to make job changes appropriately.
18.06 Demonstrate acceptable personal hygiene and a professional appearance.
18.07 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
18.08 Describe the importance of a drug-free workplace and the industry policies regarding alcohol and drug use.
18.09 Demonstrate appropriate responses to performance evaluation from employer, supervisor, or other persons in the workplace.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8103410
Course Title: Agricultural Machinery Mechanics 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of recordkeeping; welding; equipment operation, service, testing and maintenance; and customer-relations skills.

19.0 KEEP RECORDS--The student will be able to:

- 19.01 Explain the purpose and importance of keeping records.
- 19.02 Demonstrate procedures for keeping records of equipment maintenance and services.
- 19.03 Keep records on each job or project assignment.
- 19.04 Complete work orders, service invoices, and requisitions.
- 19.05 Prepare a written cost estimate of repair work and warranty claims.

20.0 WELD, BRAZE, AND CUT, USING APPROPRIATE EQUIPMENT--The student will be able to:

- 20.01 Set up, adjust, operate, and maintain MIG (middle inert gas) and TIG (tungsten inert gas) welding equipment.
- 20.02 Set up, adjust, and operate plasma cutting equipment.
- 20.03 Select recommended operational procedures and supplies for specific jobs.
- 20.04 Practice all recommended safety precautions.
- 20.05 Demonstrate the different welding positions.
- 20.06 Cut and pierce metals, using oxyacetylene and plasma.
- 20.07 Braze metals.
- 20.08 Apply hard-surface alloys.
- 20.09 Store welding equipment and supplies according to the recommended storage procedures.

21.0 OPERATE, SERVICE, TEST, AND MAINTAIN AGRICULTURAL MACHINERY AND EQUIPMENT--The student will be able to:

- 21.01 Operate and adjust agricultural machinery and equipment that are used in the local area, according to the operator's manuals, such as the following:
  - a. agricultural wheel-type tractors
  - b. planting equipment
  - c. primary and secondary tillage equipment
  - d. pesticide-application equipment
  - e. harvesting equipment
  - f. fertilization equipment

21.02 Remove, clean, test, repair, and reinstall parts of machinery and equipment, using repair manuals.
21.03 Service machinery, using service manuals.
21.04 Follow safety precautions when operating, servicing, and maintaining machines and equipment.

22.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

22.01 Exercise self-control.
22.02 Identify and demonstrate appropriate responses to criticism.
22.03 Explain the effects of positive human-relations skills on success in the business.
22.04 Demonstrate respect for people and property.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8103420
Course Title: Agricultural Machinery Mechanics 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of service, repair and maintenance of the following: the lubrication system; the cooling system; the intake, exhaust, and turbo-charged systems; the fuel-delivery system; and the brake system.

23.0 DIAGNOSE, SERVICE, AND REPAIR THE LUBRICATION SYSTEM--The student will be able to:

- 23.01 Change oil filters.
- 23.02 Check and change oils and other lubricants in engines.
- 23.03 Diagnose and replace damaged or worn components of the system.

24.0 TEST, REPAIR AND/OR REPLACE, AND MAINTAIN THE COOLING SYSTEM--The student will be able to:

- 24.01 Test coolant.
- 24.02 Flush and clean the system.
- 24.03 Test, repair and/or replace parts of the system.
- 24.04 Adjust parts of the system for proper operation.

25.0 TEST, REPAIR AND/OR REPLACE THE INTAKE, EXHAUST, AND TURBO-CHARGED SYSTEMS--The student will be able to:

- 25.01 Troubleshoot the intake, exhaust, and turbo-charged systems, using recommended diagnostic equipment.
- 25.02 Repair and replace parts of the systems.
- 25.03 Service and adjust the systems for proper operation.

26.0 TEST, REPAIR AND/OR REPLACE THE FUEL-DELIVERY SYSTEM, USING SERVICE MANUALS--The student will be able to:

- 26.01 Remove, clean, rebuild, and reinstall carburetors.
- 26.02 Bleed the diesel-fuel system.
- 26.03 Remove and reinstall a diesel-fuel-injection pump, according to the manufacturer's specifications.
- 26.05 Replace components of the fuel system.
- 26.06 Service and adjust parts of the fuel system for proper operation.

27.0 TEST, REPAIR AND/OR REPLACE, AND MAINTAIN THE BRAKE SYSTEM--The student will be able to:

- 27.01 Drain, refill, and adjust the brake system.

27.02 Test brake-system components, using recommended diagnostic equipment.
27.03 Repair and replace parts of the system.
27.04 Service and adjust the system for proper operation.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8103430
Course Title: Agricultural Machinery Mechanics 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of service, repair and maintenance of the following: internal-combustion engines; electrical system; transmission system; hydraulic system; and final-drive system; and business management skills.

28.0 TEST, REPAIR AND/OR REPLACE INTERNAL-COMBUSTION ENGINES--The student will be able to:

- 28.01 Troubleshoot components of the engine, using recommended diagnostic equipment.
- 28.02 Repair and replace components of the basic engine, using repair manuals.
- 28.03 Service and adjust all parts of the engine for proper operation.

29.0 TEST, REPAIR AND/OR REPLACE THE ELECTRICAL SYSTEM, USING SERVICE MANUALS--The student will be able to:

- 29.01 Troubleshoot the electrical system, using recommended diagnostic equipment.
- 29.02 Repair and replace components of the electrical system.
- 29.03 Service and adjust all parts of the system for proper operation.

30.0 DIAGNOSE, SERVICE, AND REPAIR TRANSMISSION SYSTEMS--The student will be able to:

- 30.01 Troubleshoot transmission components, using recommended diagnostic equipment.
- 30.02 Repair and replace parts of transmission systems.
- 30.03 Service and adjust parts of different transmission systems for proper operation.

31.0 SERVICE AND REPAIR TRANSFER CASE--The student will be able to:

- 31.01 Troubleshoot transfer case components.
- 31.02 Service and adjust system components.
- 31.03 Repair and replace system components.
- 31.04 Change filters and drain, flush, and refill the transfer case system.

32.0 DIAGNOSE, SERVICE, REPAIR, AND MAINTAIN THE HYDRAULIC SYSTEM--The student will be able to:

32.01 Change filters and drain, flush, and refill the hydraulic system.
32.02 Troubleshoot hydraulic-system components, using recommended diagnostic equipment.
32.03 Repair and replace parts of the system.
32.04 Service and adjust the system for proper operation.

33.0 DIAGNOSE, SERVICE, AND REPAIR THE FINAL-DRIVE SYSTEMS--The student will be able to:

33.01 Diagnose the final-drive systems, using recommended diagnostic equipment.
33.02 Repair and replace parts of the systems.
33.03 Service and adjust the systems for proper operation.

34.0 APPLY BUSINESS-MANAGEMENT SKILLS AND IDENTIFY APPROPRIATE LEGAL DOCUMENTS--The student will be able to:

34.01 Identify personal/business liability and the use of liability insurance.
34.02 Identify applicable insurance requirements.
34.03 Identify and complete basic business-tax-liability forms.
34.04 Identify the requirements of greenbelt, bluebelt, and homestead tax exemptions.
34.05 Interpret enterprise budgets and amortization tables.
34.06 Identify characteristics of legal documents (such as contracts, deeds, and leases).
34.07 Identify applicable land-use and zoning regulations, including a comprehensive plan.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Agricultural Machinery Operations

	Secondary	PSAV
Program Number	**8103200**	**A010204**
CIP Number	0101.020400	0101.020400
Grade Level	9-12, 30, 31	30, 31
Standard Length	4 credits	600 hours
Certification	VOC AGRI @4	VOC AGRI @4
	AGRI @4	AGRI @2 @4
	AGRI MECH #7	AGRI MECH @7 G
	AGRICULTUR 1 @2	AGRICULTUR 1 @2
Basic-Skills Grade Level		
	Math	9
	Language	9
	Reading	9

INTENDED OUTCOMES: After successfully completing the appropriate outcomes for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FARM MACHINE TENDER - DOT Code 409.685-010 (CORE)

01.0 Describe the socioeconomic role of the agricultural industry.
02.0 Apply scientific and technological principles to the agricultural industry.
03.0 Practice agricultural safety.
04.0 Demonstrate the use of tools, equipment, and instruments in the agricultural industry.
05.0 Describe the principles of integrated pest management (IPM).
06.0 Describe the principles of plant and/or animal growth and reproduction.
07.0 Apply business skills and economic principles to the agricultural industry.
08.0 Explain the basic marketing processes in the agricultural industry.
09.0 Demonstrate human-relations, communications, and leadership skills.
10.0 Practice personal, equipment, and shop safety.
11.0 Select and use hand and power tools.
12.0 Install simple electrical circuits.
13.0 Demonstrate electric and gas welding.
14.0 Service and maintain small gasoline engines.
15.0 Perform preventive maintenance, checks, and services for tractors.
16.0 Perform minor repairs on an irrigation system.
17.0 Apply basic financial-management skills.
18.0 Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
FARM EQUIPMENT OPERATOR - OES Code 79021530

19.0 Keep records.

20.0 Practice soil conservation.
21.0 Operate, service, and maintain agricultural machinery and equipment.
22.0 Apply business-management skills and identify appropriate legal documents.
23.0 Demonstrate positive customer-relations skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Agricultural Machinery Operations
Secondary Number: 8103200
Postsecondary Number: A010204

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FARM MACHINE TENDER - DOT Code 409.685-010 (CORE)

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

01.01 Prepare a report on the history of the agricultural industry.
01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

02.01 Discuss the importance of scientific classification in agriculture.
02.02 Use the scientific method to solve problems in agriculture.
02.03 Explain the use of genetics in agriculture, including probability applications.
02.04 Analyze the impact of recent technology on the agricultural industry.
02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
02.10 Explain the interaction of one natural resource with another.
02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.
02.12 Explain the flow of energy from the sun through agricultural systems.
02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
02.14 Apply principles of waste management to environmental problems common to agricultural systems.

02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).

03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:

03.01 List the most common causes of agricultural accidents.
03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
03.04 Describe symptoms of pesticide poisoning.
03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
03.06 Select, mix, and apply a nonrestricted chemical, according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
03.08 Identify the proper disposal of containers and residual pesticides.
03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).

04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:

04.01 Choose the proper tools, equipment, and instruments for a specific job.
04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
04.04 Demonstrate the ability to use an equipment manual.
04.05 Demonstrate the use of selected tools, equipment, and instruments.
04.06 Service, maintain, and store tools, equipment, instruments, and supplies.

05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:

05.01 Identify types of pests and beneficials.
05.02 Identify and select an appropriate control for each type of pest and/or weed.
05.03 Describe the principles and benefits of integrated pest management.

06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:

For plant:

06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
06.03 Propagate plants through sexual and asexual means.
06.04 Identify the nutrients required for plant growth and development and the role of each.
06.05 Extract pertinent information from a fertilizer label.

For animal:

06.07 Identify the nutrients required for animal growth and development and the role of each.
06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

07.01 Explain the basic economic principles in the agricultural industry.
07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
07.04 Select and use computer applications.
07.05 Analyze and interpret agribusiness data.
07.06 Keep and maintain supervised agricultural experience (SAE) records.
07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

08.01 Describe key factors in marketing agricultural products.
08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

09.01 Demonstrate acceptable work habits and attitudes.
09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
09.03 Communicate effectively in verbal, written, and nonverbal modes.
09.04 Recognize and demonstrate good listening skills.
09.05 Conduct small informal and formal group meetings.

09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
09.07 Recognize and demonstrate communications skills in the workplace.
09.08 Demonstrate effective telephone skills.

10.0 PRACTICE PERSONAL, EQUIPMENT, AND SHOP SAFETY--The student will be able to:

10.01 Identify and eliminate hazards in agricultural mechanics settings.
10.02 Observe color-coded warnings in work areas and on equipment and machinery.
10.03 Describe appropriate actions in case of fire, accident, or other emergencies.
10.04 Describe personal protective equipment (PPE) and appropriate clothing.
10.05 Demonstrate safety procedures and workplace "housekeeping" practices.
10.06 Safely handle and store flammable and non-restricted chemicals.
10.07 Operate machinery and equipment according to the safety recommendations of the manufacturers.
10.08 Comply with the Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) rules and regulations.
10.09 Describe the Florida "Right-to-Know" law (as recorded in Florida Statutes, Chapter 442).

11.0 SELECT AND USE HAND AND POWER TOOLS--The student will be able to:

11.01 Identify the capabilities and limitations of hand and power tools.
11.02 Select and safely use hand and power tools.
11.03 Select and use proper PPE for hand and power tools.
11.04 Identify worn, damaged, or abused tools.
11.05 Select and demonstrate the appropriate procedures for sharpening tools.

12.0 INSTALL SIMPLE ELECTRICAL CIRCUITS--The student will be able to:

12.01 Demonstrate the principles of AC and DC circuitry.
12.02 Demonstrate series and parallel circuitry.
12.03 Explain the scientific principles of electrical systems.
12.04 Plan and install a simple wiring system.
12.05 Test electrical circuits.

13.0 DEMONSTRATE ELECTRIC AND GAS WELDING--The student will be able to:

13.01 Select and use gas-welding equipment.
13.02 Select and use electric arc-welding equipment and materials.

14.0 SERVICE AND MAINTAIN SMALL GASOLINE ENGINES--The student will be able to:

14.01 Explain the scientific principles of small engines.
14.02 Identify major parts and describe the general operation of small gasoline engines (2- and 4-stroke cycle).
14.03 Practice appropriate safety precautions.
14.04 Troubleshoot and perform minor repairs on small gasoline engines.

15.0 PERFORM PREVENTIVE MAINTENANCE, CHECKS, AND SERVICES FOR TRACTORS--The student will be able to:

15.01 Explain the scientific principles of hydraulic and transmission systems.
15.02 Perform daily operator maintenance checks for tractors.
15.03 Determine the preventive-maintenance procedures, using the tractor operator's manual.
15.04 Perform scheduled preventive-maintenance procedures.
15.05 Interpret and perform operator's trouble-shooting procedures as described in the manual.
15.06 Keep records of tractor maintenance and services.

16.0 PERFORM MINOR REPAIR ON AN IRRIGATION SYSTEM--The student will be able to:

16.01 Identify the basic components of irrigation systems.
16.02 Differentiate various types of irrigation systems.
16.03 Identify state and local regulatory agencies for water management.
16.04 Perform minor repair on an irrigation system.

17.0 APPLY BASIC FINANCIAL-MANAGEMENT SKILLS--The student will be able to:

17.01 Complete basic financial records.
17.02 Demonstrate the use of banking procedures.
17.03 Calculate interest on loans.
17.04 Complete selected income-tax-return forms.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct group meetings, using parliamentary procedures and public-speaking skills.
18.02 Identify the documents that are required for a job application.
18.03 Complete a job application form.
18.04 Demonstrate competencies in job-interview techniques.
18.05 Demonstrate knowledge of how to make job changes appropriately.
18.06 Demonstrate acceptable personal hygiene and a professional appearance.
18.07 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
18.08 Describe the importance of a drug-free workplace and the industry policies regarding alcohol and drug use.
18.09 Demonstrate appropriate responses to performance evaluation from employer, supervisor, or other persons in the workplace.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

FARM EQUIPMENT OPERATOR - OES Code 79021530

19.0 KEEP RECORDS--The student will be able to:

19.01 Explain the purpose and importance of keeping records.
19.02 Demonstrate procedures for keeping records of equipment operation, maintenance, and services using computers to process information.
19.03 Keep records on each job or project assignment.

20.0 PRACTICE SOIL CONSERVATION--The student will be able to:

20.01 Determine soil conditions such as texture, moisture, and structure.
20.02 Identify the proper conditions of soil for machine operations.
20.03 Practice soil conservation according to a farm plan.

21.0 OPERATE, SERVICE, AND MAINTAIN AGRICULTURAL MACHINERY AND EQUIPMENT--The student will be able to:

21.01 Follow safety precautions when operating, servicing, and maintaining machinery and equipment.
21.02 Operate and adjust agricultural machinery and equipment used in the local area such as the following, according to the operator's manuals:
a. agricultural wheel-type tractors
b. planting equipment
c. primary and secondary tillage equipment
d. pesticide-application equipment
e. harvesting equipment
f. fertilization equipment
21.03 Service machinery, using service manuals.

22.0 APPLY BUSINESS-MANAGEMENT SKILLS AND IDENTIFY APPROPRIATE LEGAL DOCUMENTS--The student will be able to:

22.01 Identify personal/business liability and the use of liability insurance.
22.02 Identify applicable insurance requirements.
22.03 Identify and complete basic business-tax liability forms.
22.04 Identify the requirements of eligibility for greenbelt, bluebelt, and homestead tax exemptions.
22.05 Interpret enterprise budgets and amortization tables.
22.06 Identify characteristics of legal documents (such as contracts, deeds, and leases).
22.07 Identify applicable land-use and zoning regulations, including a comprehensive plan.

23.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

23.01 Exercise self-control.
23.02 Identify and demonstrate appropriate responses to criticism.

23.03 Explain the effects of positive human-relations skills on success in the business.
23.04 Demonstrate respect for people and property.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8106810
Course Title: Agriscience Foundations I
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as a core and is designed to develop competencies in the areas of agricultural history; global importance of agriculture; career opportunities; applied scientific and technological concepts; ecosystems; agricultural safety; principles of integrated pest management; principles of plant and animal growth; economic principles; agricultural marketing; and human relations skills.

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.

02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.
02.12 Explain the flow of energy from the sun through agricultural systems.
02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
02.14 Apply principles of waste management to environmental problems common to agricultural systems.
02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).

03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:

03.01 List the most common causes of agricultural accidents.
03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
03.04 Describe symptoms of pesticide poisoning.
03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
03.06 Select, mix, and apply a nonrestricted chemical, according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
03.08 Identify the proper disposal of containers and residual pesticides.
03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).

04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:

04.01 Choose the proper tools, equipment, and instruments for a specific job.
04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
04.04 Demonstrate the ability to use an equipment manual.
04.05 Demonstrate the use of selected tools, equipment, and instruments.
04.06 Service, maintain, and store tools, equipment, instruments, and supplies.

05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:

05.01 Identify types of pests and beneficials.

05.02 Identify and select an appropriate control for each type of pest and/or weed.
05.03 Describe the principles and benefits of integrated pest management.

06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:

For plant:

06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
06.03 Propagate plants through sexual and asexual means.
06.04 Identify the nutrients required for plant growth and development and the role of each.
06.05 Extract pertinent information from a fertilizer label.

For animal:

06.07 Identify the nutrients required for animal growth and development and the role of each.
06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

07.01 Explain the basic economic principles in the agricultural industry.
07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
07.04 Select and use computer applications.
07.05 Analyze and interpret agribusiness data.
07.06 Keep and maintain supervised agricultural experience (SAE) records.
07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

08.01 Describe key factors in marketing agricultural products.
08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

09.01 Demonstrate acceptable work habits and attitudes.

09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
09.03 Communicate effectively in verbal, written, and nonverbal modes.
09.04 Recognize and demonstrate good listening skills.
09.05 Conduct small informal and formal group meetings.
09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
09.07 Recognize and demonstrate communications skills in the workplace.
09.08 Demonstrate effective telephone skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8103120
Course Title: Agricultural Mechanics 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of safety; selection and use of tools; electrical circuits; and employability skills.

10.0 PRACTICE PERSONAL, EQUIPMENT, AND SHOP SAFETY--The student will be able to:

- 10.01 Identify and eliminate hazards in agricultural mechanics settings.
- 10.02 Observe color-coded warnings in work areas and on equipment and machinery.
- 10.03 Describe appropriate actions in case of fire, accident, or other emergencies.
- 10.04 Describe personal protective equipment (PPE) and appropriate clothing.
- 10.05 Demonstrate safety procedures and workplace "housekeeping" practices.
- 10.06 Safely handle and store flammable and non-restricted chemicals.
- 10.07 Operate machinery and equipment according to the safety recommendations of the manufacturers.
- 10.08 Comply with the Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) rules and regulations.
- 10.09 Describe the Florida "Right-to-Know" law (as recorded in Florida Statutes, Chapter 442).

11.0 SELECT AND USE HAND AND POWER TOOLS--The student will be able to:

- 11.01 Identify the capabilities and limitations of hand and power tools.
- 11.02 Select and safely use hand and power tools.
- 11.03 Select and use proper PPE for hand and power tools.
- 11.04 Identify worn, damaged, or abused tools.
- 11.05 Select and demonstrate the appropriate procedures for sharpening tools.

12.0 INSTALL SIMPLE ELECTRICAL CIRCUITS--The student will be able to:

- 12.01 Demonstrate the principles of AC and DC circuitry.
- 12.02 Demonstrate series and parallel circuitry.
- 12.03 Explain the scientific principles of electrical systems.
- 12.04 Plan and install a simple wiring system.
- 12.05 Test electrical circuits.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct group meetings, using parliamentary procedures and public-speaking skills.
18.02 Identify the documents that are required for a job application.
18.03 Complete a job application form.
18.04 Demonstrate competencies in job-interview techniques.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8103130
Course Title: Agricultural Mechanics 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of welding; small gasoline engine service and repair; preventative maintenance procedures; irrigation system repair; financial management skills and employability skills.

13.0 DEMONSTRATE ELECTRIC AND GAS WELDING--The student will be able to:

- 13.01 Select and use gas-welding equipment.
- 13.02 Select and use electric arc-welding equipment and materials.

14.0 SERVICE AND MAINTAIN SMALL GASOLINE ENGINES--The student will be able to:

- 14.01 Explain the scientific principles of small engines.
- 14.02 Identify major parts and describe the general operation of small gasoline engines (2- and 4-stroke cycle).
- 14.03 Practice appropriate safety precautions.
- 14.04 Troubleshoot and perform minor repairs on small gasoline engines.

15.0 PERFORM PREVENTIVE MAINTENANCE, CHECKS, AND SERVICES FOR TRACTORS--The student will be able to:

- 15.01 Explain the scientific principles of hydraulic and transmission systems.
- 15.02 Perform daily operator maintenance checks for tractors.
- 15.03 Determine the preventive-maintenance procedures, using the tractor operator's manual.
- 15.04 Perform scheduled preventive-maintenance procedures.
- 15.05 Interpret and perform operator's trouble-shooting procedures as described in the manual.
- 15.06 Keep records of tractor maintenance and services.

16.0 PERFORM MINOR REPAIR ON AN IRRIGATION SYSTEM--The student will be able to:

- 16.01 Identify the basic components of irrigation systems.
- 16.02 Differentiate various types of irrigation systems.
- 16.03 Identify state and local regulatory agencies for water management.
- 16.04 Perform minor repair on an irrigation system.

17.0 APPLY BASIC FINANCIAL-MANAGEMENT SKILLS--The student will be able to:

17.01 Complete basic financial records.
17.02 Demonstrate the use of banking procedures.
17.03 Calculate interest on loans.
17.04 Complete selected income-tax-return forms.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.05 Demonstrate knowledge of how to make job changes appropriately.
18.06 Demonstrate acceptable personal hygiene and a professional appearance.
18.07 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
18.08 Describe the importance of a drug-free workplace and the industry policies regarding alcohol and drug use.
18.09 Demonstrate appropriate responses to performance evaluation from employer, supervisor, or other persons in the workplace.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8103210
Course Title: Agricultural Machinery Operations 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of recordkeeping; soil conservation; operation, service and maintenance of machinery and equipment; business management skills; and customer relations.

19.0 KEEP RECORDS--The student will be able to:

- 19.01 Explain the purpose and importance of keeping records.
- 19.02 Demonstrate procedures for keeping records of equipment operation, maintenance, and services using computers to process information.
- 19.03 Keep records on each job or project assignment.

20.0 PRACTICE SOIL CONSERVATION--The student will be able to:

- 20.01 Determine soil conditions such as texture, moisture, and structure.
- 20.02 Identify the proper conditions of soil for machine operations.
- 20.03 Practice soil conservation according to a farm plan.

21.0 OPERATE, SERVICE, AND MAINTAIN AGRICULTURAL MACHINERY AND EQUIPMENT--The student will be able to:

- 21.01 Follow safety precautions when operating, servicing, and maintaining machinery and equipment.
- 21.02 Operate and adjust agricultural machinery and equipment used in the local area such as the following, according to the operator's manuals:
  - a. agricultural wheel-type tractors
  - b. planting equipment
  - c. primary and secondary tillage equipment
  - d. pesticide-application equipment
  - e. harvesting equipment
  - f. fertilization equipment
- 21.03 Service machinery, using service manuals.

22.0 APPLY BUSINESS-MANAGEMENT SKILLS AND IDENTIFY APPROPRIATE LEGAL DOCUMENTS--The student will be able to:

- 22.01 Identify personal/business liability and the use of liability insurance.
- 22.02 Identify applicable insurance requirements.
- 22.03 Identify and complete basic business-tax liability forms.

22.04 Identify the requirements of eligibility for greenbelt, bluebelt, and homestead tax exemptions.
22.05 Interpret enterprise budgets and amortization tables.
22.06 Identify characteristics of legal documents (such as contracts, deeds, and leases).
22.07 Identify applicable land-use and zoning regulations, including a comprehensive plan.

23.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

23.01 Exercise self-control.
23.02 Identify and demonstrate appropriate responses to criticism.
23.03 Explain the effects of positive human-relations skills on success in the business.
23.04 Demonstrate respect for people and property.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Diversified Agricultural Mechanics

	Secondary	PSAV
Program Number	**8103300**	**A010203**
CIP Number	0101.020310	0101.020310
Grade Level	9-12, 30, 31	30, 31
Standard Length	4 credits	600 hours
Certification	VOC AGRI @4	VOC AGRI @4
	AGRI @4	AGRI @2 @4
	AGRI MECH #7	AGRI MECH @7 G
	AGRICULTUR 1 @2	AGRICULTUR 1 @2
Basic-Skills Grade Level		
	Math	9
	Language	9
	Reading	9

INTENDED OUTCOMES: After successfully completing the appropriate outcomes for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FARM MACHINE TENDER - DOT Code 409.685-010 (CORE)

01.0 Describe the socioeconomic role of the agricultural industry.
02.0 Apply scientific and technological principles to the agricultural industry.
03.0 Practice agricultural safety.
04.0 Demonstrate the use of tools, equipment, and instruments in the agricultural industry.
05.0 Describe the principles of integrated pest management (IPM).
06.0 Describe the principles of plant and/or animal growth and reproduction.
07.0 Apply business skills and economic principles to the agricultural industry.
08.0 Explain the basic marketing processes in the agricultural industry.
09.0 Demonstrate human-relations, communications, and leadership skills.
10.0 Practice personal, equipment, and shop safety.
11.0 Select and use hand and power tools.
12.0 Install simple electrical circuits.
13.0 Demonstrate electric and gas welding.
14.0 Service and maintain small gasoline engines.
15.0 Perform preventive maintenance, checks, and services for tractors.
16.0 Perform minor repairs on an irrigation system.
17.0 Apply basic financial-management skills.
18.0 Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
FARM EQUIPMENT MECHANIC I - DOT Code 624-281.010

19.0 Operate and maintain agricultural tools and equipment.

20.0 Plan, draw, and construct a project.
21.0 Prepare and finish surfaces.
22.0 Replace simple electric motors, controls, and sensing devices.
23.0 Plan, repair, and maintain a basic irrigation system.
24.0 Perform basic plumbing procedures.
25.0 Mix and pour concrete and use masonry materials.
26.0 Weld, braze, and cut, using appropriate equipment.
27.0 Construct and maintain agricultural structures.
28.0 Apply business-management skills and identify appropriate legal documents.
29.0 Demonstrate positive customer-relations skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Diversified Agricultural Mechanics
Secondary Number: 8103300
Postsecondary Number: A010203

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FARM MACHINE TENDER - DOT Code 409.685-010 (CORE)

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.
- 02.12 Explain the flow of energy from the sun through agricultural systems.
- 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
- 02.14 Apply principles of waste management to environmental problems common to agricultural systems.

02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).

03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:

03.01 List the most common causes of agricultural accidents.
03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
03.04 Describe symptoms of pesticide poisoning.
03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
03.06 Select, mix, and apply a nonrestricted chemical, according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
03.08 Identify the proper disposal of containers and residual pesticides.
03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).

04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:

04.01 Choose the proper tools, equipment, and instruments for a specific job.
04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
04.04 Demonstrate the ability to use an equipment manual.
04.05 Demonstrate the use of selected tools, equipment, and instruments.
04.06 Service, maintain, and store tools, equipment, instruments, and supplies.

05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:

05.01 Identify types of pests and beneficials.
05.02 Identify and select an appropriate control for each type of pest and/or weed.
05.03 Describe the principles and benefits of integrated pest management.

06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:

For plant:

06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
06.03 Propagate plants through sexual and asexual means.
06.04 Identify the nutrients required for plant growth and development and the role of each.
06.05 Extract pertinent information from a fertilizer label.

For animal:

06.07 Identify the nutrients required for animal growth and development and the role of each.
06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

07.01 Explain the basic economic principles in the agricultural industry.
07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
07.04 Select and use computer applications.
07.05 Analyze and interpret agribusiness data.
07.06 Keep and maintain supervised agricultural experience (SAE) records.
07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

08.01 Describe key factors in marketing agricultural products.
08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

09.01 Demonstrate acceptable work habits and attitudes.
09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
09.03 Communicate effectively in verbal, written, and nonverbal modes.
09.04 Recognize and demonstrate good listening skills.
09.05 Conduct small informal and formal group meetings.

09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
09.07 Recognize and demonstrate communications skills in the workplace.
09.08 Demonstrate effective telephone skills.

10.0 PRACTICE PERSONAL, EQUIPMENT, AND SHOP SAFETY--The student will be able to:

10.01 Identify and eliminate hazards in agricultural mechanics settings.
10.02 Observe color-coded warnings in work areas and on equipment and machinery.
10.03 Describe appropriate actions in case of fire, accident, or other emergencies.
10.04 Describe personal protective equipment (PPE) and appropriate clothing.
10.05 Demonstrate safety procedures and workplace "housekeeping" practices.
10.06 Safely handle and store flammable and non-restricted chemicals.
10.07 Operate machinery and equipment according to the safety recommendations of the manufacturers.
10.08 Comply with the Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) rules and regulations.
10.09 Describe the Florida "Right-to-Know" law (as recorded in Florida Statutes, Chapter 442).

11.0 SELECT AND USE HAND AND POWER TOOLS--The student will be able to:

11.01 Identify the capabilities and limitations of hand and power tools.
11.02 Select and safely use hand and power tools.
11.03 Select and use proper PPE for hand and power tools.
11.04 Identify worn, damaged, or abused tools.
11.05 Select and demonstrate the appropriate procedures for sharpening tools.

12.0 INSTALL SIMPLE ELECTRICAL CIRCUITS--The student will be able to:

12.01 Demonstrate the principles of AC and DC circuitry.
12.02 Demonstrate series and parallel circuitry.
12.03 Explain the scientific principles of electrical systems.
12.04 Plan and install a simple wiring system.
12.05 Test electrical circuits.

13.0 DEMONSTRATE ELECTRIC AND GAS WELDING--The student will be able to:

13.01 Select and use gas-welding equipment.
13.02 Select and use electric arc-welding equipment and materials.

14.0 SERVICE AND MAINTAIN SMALL GASOLINE ENGINES--The student will be able to:

14.01 Explain the scientific principles of small engines.
14.02 Identify major parts and describe the general operation of small gasoline engines (2- and 4-stroke cycle).
14.03 Practice appropriate safety precautions.
14.04 Troubleshoot and perform minor repairs on small gasoline engines.

15.0 PERFORM PREVENTIVE MAINTENANCE, CHECKS, AND SERVICES FOR TRACTORS--The student will be able to:

15.01 Explain the scientific principles of hydraulic and transmission systems.
15.02 Perform daily operator maintenance checks for tractors.
15.03 Determine the preventive-maintenance procedures, using the tractor operator's manual.
15.04 Perform scheduled preventive-maintenance procedures.
15.05 Interpret and perform operator's trouble-shooting procedures as described in the manual.
15.06 Keep records of tractor maintenance and services.

16.0 PERFORM MINOR REPAIR ON AN IRRIGATION SYSTEM--The student will be able to:

16.01 Identify the basic components of irrigation systems.
16.02 Differentiate various types of irrigation systems.
16.03 Identify state and local regulatory agencies for water management.
16.04 Perform minor repair on an irrigation system.

17.0 APPLY BASIC FINANCIAL-MANAGEMENT SKILLS--The student will be able to:

17.01 Complete basic financial records.
17.02 Demonstrate the use of banking procedures.
17.03 Calculate interest on loans.
17.04 Complete selected income-tax-return forms.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct group meetings, using parliamentary procedures and public-speaking skills.
18.02 Identify the documents that are required for a job application.
18.03 Complete a job application form.
18.04 Demonstrate competencies in job-interview techniques.
18.05 Demonstrate knowledge of how to make job changes appropriately.
18.06 Demonstrate acceptable personal hygiene and a professional appearance.
18.07 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
18.08 Describe the importance of a drug-free workplace and the industry policies regarding alcohol and drug use.
18.09 Demonstrate appropriate responses to performance evaluation from employer, supervisor, or other persons in the workplace.

OCCUPATIONAL COMPLETION POINT - DATA B

FARM EQUIPMENT MECHANIC I - DOT Code 624-281.010

19.0 OPERATE AND MAINTAIN AGRICULTURAL TOOLS AND EQUIPMENT--The student will be able to:

- 19.01 Set up, adjust, and operate selected agricultural equipment according to the operator's manual.
- 19.02 Maintain and repair selected agricultural tools and equipment, using repair manuals.
- 19.03 Prepare equipment for storage.
- 19.04 Keep records of equipment maintenance and services using computers to process information.

20.0 PLAN, DRAW, AND CONSTRUCT A PROJECT--The student will be able to:

- 20.01 Plan and sketch a project.
- 20.02 Design and draw a project using drawing instruments and/or computer-assisted design (CAD) software.
- 20.03 Calculate a bill of materials.
- 20.04 Construct a project.

21.0 PREPARE AND FINISH SURFACES--The student will be able to:

- 21.01 Identify and select appropriate finishes (such as paint, varnish, and stain).
- 21.02 Repair worn or damaged surfaces using fillers, caulking, and sealers.
- 21.03 Prepare surfaces and apply finishes.

22.0 REPLACE SIMPLE ELECTRIC MOTORS, CONTROLS, AND SENSING DEVICES--The student will be able to:

- 22.01 Identify different types of electric motors.
- 22.02 Differentiate various types of controls.
- 22.03 Replace electric motors, controls, and sensing devices.

23.0 PLAN, REPAIR, AND MAINTAIN A BASIC IRRIGATION SYSTEM--The student will be able to:

- 23.01 Determine irrigation requirements.
- 23.02 Plan and lay out an irrigation system, using computer applications.
- 23.03 Repair and maintain an irrigation system.

24.0 PERFORM BASIC PLUMBING PROCEDURES--The student will be able to:

- 24.01 Identify and select plumbing materials and tools.
- 24.02 Plan and construct a simple water-delivery system.
- 24.03 Troubleshoot and perform minor plumbing repairs.
- 24.04 Locate the state and local codes and standards and describe the importance of complying with them.

25.0 MIX AND POUR CONCRETE AND USE MASONRY MATERIALS--The student will be able to:

25.01 Calculate concrete and other materials for a masonry project.
25.02 Prepare forms; mix and pour concrete.
25.03 Lay concrete blocks and/or bricks.

26.0 WELD, BRAZE, AND CUT, USING APPROPRIATE EQUIPMENT--The student will be able to:

26.01 Set up, adjust, operate, and maintain MIG (middle inert gas) and TIG (tungsten inert gas) welding equipment.
26.02 Set up, adjust, and operate plasma cutting equipment.
26.03 Select recommended operational procedures and supplies for specific jobs.
26.04 Practice all recommended safety precautions.
26.05 Demonstrate the different welding positions.
26.06 Cut and pierce metals, using oxyacetylene and plasma.
26.07 Braze metals.
26.08 Apply hard-surface alloys.
26.09 Store welding equipment and supplies according to the recommended storage procedures.
26.10 Locate the state and local codes and standards and describe the importance of complying with them.

27.0 CONSTRUCT AND MAINTAIN AGRICULTURAL STRUCTURES--The student will be able to:

27.01 Read and interpret basic construction plans.
27.02 Lay out an agricultural structure for construction with the use of a transit.
27.03 Demonstrate basic carpentry construction and procedures.
27.04 Construct a fence.
27.05 Maintain and repair agricultural structures.

28.0 APPLY BUSINESS-MANAGEMENT SKILLS AND IDENTIFY APPROPRIATE LEGAL DOCUMENTS--The student will be able to:

28.01 Identify personal/business liability and the use of liability insurance.
28.02 Identify applicable insurance requirements.
28.03 Identify and complete basic business-tax-liability forms.
28.04 Identify requirements of eligibility for greenbelt, bluebelt, and homestead tax exemptions.
28.05 Interpret enterprise budgets and amortization tables.
28.06 Identify characteristics of legal documents (such as contracts, deeds, legal land descriptions and leases).
28.07 Identify applicable land-use and zoning regulations, including a comprehensive plan.

29.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

29.01 Exercise self-control.

29.02 Identify and demonstrate appropriate responses to criticism.

29.03 Explain the effects of positive human-relations skills on success in the business.

29.04 Demonstrate respect for people and property.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8106810
Course Title: Agriscience Foundations I
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as a core and is designed to develop competencies in the areas of agricultural history; global importance of agriculture; career opportunities; applied scientific and technological concepts; ecosystems; agricultural safety; principles of integrated pest management; principles of plant and animal growth; economic principles; agricultural marketing; and human relations skills.

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource with another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.

02.12 Explain the flow of energy from the sun through agricultural systems.
02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
02.14 Apply principles of waste management to environmental problems common to agricultural systems.
02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).

03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:

03.01 List the most common causes of agricultural accidents.
03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
03.04 Describe symptoms of pesticide poisoning.
03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
03.06 Select, mix, and apply a nonrestricted chemical, according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
03.08 Identify the proper disposal of containers and residual pesticides.
03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).

04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:

04.01 Choose the proper tools, equipment, and instruments for a specific job.
04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
04.04 Demonstrate the ability to use an equipment manual.
04.05 Demonstrate the use of selected tools, equipment, and instruments.
04.06 Service, maintain, and store tools, equipment, instruments, and supplies.

05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:

05.01 Identify types of pests and beneficials.
05.02 Identify and select an appropriate control for each type of pest and/or weed.

05.03 Describe the principles and benefits of integrated pest management.

06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:

For plant:

06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
06.03 Propagate plants through sexual and asexual means.
06.04 Identify the nutrients required for plant growth and development and the role of each.
06.05 Extract pertinent information from a fertilizer label.

For animal:

06.07 Identify the nutrients required for animal growth and development and the role of each.
06.08 Identify and describe the anatomical systems of animals and the functions of each, including major components.
06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

07.01 Explain the basic economic principles in the agricultural industry.
07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
07.04 Select and use computer applications.
07.05 Analyze and interpret agribusiness data.
07.06 Keep and maintain supervised agricultural experience (SAE) records.
07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

08.01 Describe key factors in marketing agricultural products.
08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

09.01 Demonstrate acceptable work habits and attitudes.
09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.

09.03 Communicate effectively in verbal, written, and nonverbal modes.
09.04 Recognize and demonstrate good listening skills.
09.05 Conduct small informal and formal group meetings.
09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
09.07 Recognize and demonstrate communications skills in the workplace.
09.08 Demonstrate effective telephone skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8103120
Course Title: Agricultural Mechanics 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of safety; selection and use of tools; electrical circuits; and employability skills.

10.0 PRACTICE PERSONAL, EQUIPMENT, AND SHOP SAFETY--The student will be able to:

- 10.01 Identify and eliminate hazards in agricultural mechanics settings.
- 10.02 Observe color-coded warnings in work areas and on equipment and machinery.
- 10.03 Describe appropriate actions in case of fire, accident, or other emergencies.
- 10.04 Describe personal protective equipment (PPE) and appropriate clothing.
- 10.05 Demonstrate safety procedures and workplace "housekeeping" practices.
- 10.06 Safely handle and store flammable and non-restricted chemicals.
- 10.07 Operate machinery and equipment according to the safety recommendations of the manufacturers.
- 10.08 Comply with the Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) rules and regulations.
- 10.09 Describe the Florida "Right-to-Know" law (as recorded in Florida Statutes, Chapter 442).

11.0 SELECT AND USE HAND AND POWER TOOLS--The student will be able to:

- 11.01 Identify the capabilities and limitations of hand and power tools.
- 11.02 Select and safely use hand and power tools.
- 11.03 Select and use proper PPE for hand and power tools.
- 11.04 Identify worn, damaged, or abused tools.
- 11.05 Select and demonstrate the appropriate procedures for sharpening tools.

12.0 INSTALL SIMPLE ELECTRICAL CIRCUITS--The student will be able to:

- 12.01 Demonstrate the principles of AC and DC circuitry.
- 12.02 Demonstrate series and parallel circuitry.
- 12.03 Explain the scientific principles of electrical systems.

12.04 Plan and install a simple wiring system.
12.05 Test electrical circuits.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct group meetings, using parliamentary procedures and public-speaking skills.
18.02 Identify the documents that are required for a job application.
18.03 Complete a job application form.
18.04 Demonstrate competencies in job-interview techniques.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8103130
Course Title: Agricultural Mechanics 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of welding; small gasoline engine service and repair; preventative maintenance procedures; irrigation system repair; financial management skills and employability skills.

13.0 DEMONSTRATE ELECTRIC AND GAS WELDING--The student will be able to:

- 13.01 Select and use gas-welding equipment.
- 13.02 Select and use electric arc-welding equipment and materials.

14.0 SERVICE AND MAINTAIN SMALL GASOLINE ENGINES--The student will be able to:

- 14.01 Explain the scientific principles of small engines.
- 14.02 Identify major parts and describe the general operation of small gasoline engines (2- and 4-stroke cycle).
- 14.03 Practice appropriate safety precautions.
- 14.04 Troubleshoot and perform minor repairs on small gasoline engines.

15.0 PERFORM PREVENTIVE MAINTENANCE, CHECKS, AND SERVICES FOR TRACTORS--The student will be able to:

- 15.01 Explain the scientific principles of hydraulic and transmission systems.
- 15.02 Perform daily operator maintenance checks for tractors.
- 15.03 Determine the preventive-maintenance procedures, using the tractor operator's manual.
- 15.04 Perform scheduled preventive-maintenance procedures.
- 15.05 Interpret and perform operator's trouble-shooting procedures as described in the manual.
- 15.06 Keep records of tractor maintenance and services.

16.0 PERFORM MINOR REPAIR ON AN IRRIGATION SYSTEM--The student will be able to:

- 16.01 Identify the basic components of irrigation systems.
- 16.02 Differentiate various types of irrigation systems.
- 16.03 Identify state and local regulatory agencies for water management.
- 16.04 Perform minor repair on an irrigation system.

17.0 APPLY BASIC FINANCIAL-MANAGEMENT SKILLS--The student will be able to:

17.01 Complete basic financial records.
17.02 Demonstrate the use of banking procedures.
17.03 Calculate interest on loans.
17.04 Complete selected income-tax-return forms.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.05 Demonstrate knowledge of how to make job changes appropriately.
18.06 Demonstrate acceptable personal hygiene and a professional appearance.
18.07 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
18.08 Describe the importance of a drug-free workplace and the industry policies regarding alcohol and drug use.
18.09 Demonstrate appropriate responses to performance evaluation from employer, supervisor, or other persons in the workplace.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8103310
Course Title: Diversified Agricultural Mechanics 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competency in the areas of operation and maintenance of tools and equipment; project construction; electric motors replacement; irrigation systems repair and maintenance; plumbing procedures; masonry; and welding.

19.0 OPERATE AND MAINTAIN AGRICULTURAL TOOLS AND EQUIPMENT--The student will be able to:

- 19.01 Set up, adjust, and operate selected agricultural equipment according to the operator's manual.
- 19.02 Maintain and repair selected agricultural tools and equipment, using repair manuals.
- 19.03 Prepare equipment for storage.
- 19.04 Keep records of equipment maintenance and services using computers to process information.

20.0 PLAN, DRAW, AND CONSTRUCT A PROJECT--The student will be able to:

- 20.01 Plan and sketch a project.
- 20.02 Design and draw a project using drawing instruments and/or computer-assisted design (CAD) software.
- 20.03 Calculate a bill of materials.
- 20.04 Construct a project.

21.0 PREPARE AND FINISH SURFACES--The student will be able to:

- 21.01 Identify and select appropriate finishes (such as paint, varnish, and stain).
- 21.02 Repair worn or damaged surfaces using fillers, caulking, and sealers.
- 21.03 Prepare surfaces and apply finishes.

22.0 REPLACE SIMPLE ELECTRIC MOTORS, CONTROLS, AND SENSING DEVICES--The student will be able to:

- 22.01 Identify different types of electric motors.
- 22.02 Differentiate various types of controls.
- 22.03 Replace electric motors, controls, and sensing devices.

23.0 PLAN, REPAIR, AND MAINTAIN A BASIC IRRIGATION SYSTEM--The student will be able to:

- 23.01 Determine irrigation requirements.

23.02 Plan and lay out an irrigation system, using computer applications.
23.03 Repair and maintain an irrigation system.

24.0 PERFORM BASIC PLUMBING PROCEDURES--The student will be able to:

24.01 Identify and select plumbing materials and tools.
24.02 Plan and construct a simple water-delivery system.
24.03 Troubleshoot and perform minor plumbing repairs.
24.04 Locate the state and local codes and standards and describe the importance of complying with them.

25.0 MIX AND POUR CONCRETE AND USE MASONRY MATERIALS--The student will be able to:

25.01 Calculate concrete and other materials for a masonry project.
25.02 Prepare forms; mix and pour concrete.
25.03 Lay concrete blocks and/or bricks.

26.0 WELD, BRAZE, AND CUT, USING APPROPRIATE EQUIPMENT--The student will be able to:

26.01 Set up, adjust, operate, and maintain MIG (middle inert gas) and TIG (tungsten inert gas) welding equipment.
26.02 Set up, adjust, and operate plasma cutting equipment.
26.03 Select recommended operational procedures and supplies for specific jobs.
26.04 Practice all recommended safety precautions.
26.05 Demonstrate the different welding positions.
26.06 Cut and pierce metals, using oxyacetylene and plasma.
26.07 Braze metals.
26.08 Apply hard-surface alloys.
26.09 Store welding equipment and supplies according to the recommended storage procedures.
26.10 Locate the state and local codes and standards and describe the importance of complying with them.

27.0 CONSTRUCT AND MAINTAIN AGRICULTURAL STRUCTURES--The student will be able to:

27.01 Read and interpret basic construction plans.
27.02 Lay out an agricultural structure for construction with the use of a transit.
27.03 Demonstrate basic carpentry construction and procedures.
27.04 Construct a fence.
27.05 Maintain and repair agricultural structures.

28.0 APPLY BUSINESS-MANAGEMENT SKILLS AND IDENTIFY APPROPRIATE LEGAL DOCUMENTS--The student will be able to:

28.01 Identify personal/business liability and the use of liability insurance.
28.02 Identify applicable insurance requirements.
28.03 Identify and complete basic business-tax-liability forms.

28.04 Identify requirements of eligibility for greenbelt, bluebelt, and homestead tax exemptions.
28.05 Interpret enterprise budgets and amortization tables.
28.06 Identify characteristics of legal documents (such as contracts, deeds, legal land descriptions, and leases).
28.07 Identify applicable land-use and zoning regulations, including a comprehensive plan.

29.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

29.01 Exercise self-control.
29.02 Identify and demonstrate appropriate responses to criticism.
29.03 Explain the effects of positive human-relations skills on success in the business.
29.04 Demonstrate respect for people and property.