

**CAREER CLUSTER™: The Agriculture, Food and Natural Resources (AFNR)
 NM Job Council’s 13 Economic Sectors Primary Alignment: Agriculture, Food and
 Forestry**

Pathways and related Programs of Study in this career cluster address careers in the production, processing, marketing, distribution, financing and development of agriculture commodities and resources including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

The Pathways for this Career Cluster™ are:

- Agribusiness Systems
- Animal Systems
- Environmental Science Systems
- Food Products and Processing Systems
- Natural Resources Systems
- Plant Systems
- Power, Structural and Technical Systems

Program Learning Outcomes from the NASDCTE Common Career Technical Core:	
<i>Note: it is expected that a student completing any Program of Studies in this Career Cluster would transition to post secondary college and career being able to know and do each of these Standards, unless otherwise noted.</i>	
1.	Analyze how issues, technologies and public policies impact systems in the AFNR Career Cluster™.
2.	Evaluate the nature and scope of the AFNR job sector and the role of the contained jobs in order to comprehend large and small-scale economic impacts.
3.	Examine and summarize the importance of health, safety and management systems in ANFR businesses.
4.	Demonstrate stewardship of natural resources in AFNR activities.
5.	Describe career opportunities and means to achieve those opportunities in each of the AFNR pathways.
6.	Analyze the interaction among ANFR systems in the production, processing and management of food, fiber and fuel and the sustainable use of natural resources.

THE CERTIFICATIONS LISTED BELOW ARISE FROM INTERVIEWS, WEBINARS, AND FOCUS GROUPS WITH SECONDARY AND POST SECONDARY EDUCATORS AS WELL AS INPUT FROM INDUSTRY PARTNERS AND REPRESENTATIVES. THE NEXT STEP FOR VALIDATION IS LABOR MARKET DATA AND THE ECONOMIC NEEDS OF BOTH THE STATE OF NEW MEXICO AND THE REGIONS.

Industry Certifications

American Welding Society (AWS)

National Center for Construction Education and Research (NCCER)

NOCTI Horticulture Certification

New Mexico Department of Agriculture: Meat/Dairy Animal Evaluation

New Mexico Department of Agriculture: Companion Animal Care

New Mexico Department of Agriculture: Plant Science

New Mexico Department of Agriculture: Natural Resource Management

New Mexico Department of Agriculture: Food Product Evaluation/Management

New Mexico Department of Agriculture: Secondary Agriculture Business Management

Landscape Irrigator License

Focus Group's Additional Comments and Suggestions:

Below are the POS's developed by the statewide stakeholders who participated in the development process.

Agribusiness Systems: Occupations involved in the coordination of all activities that contribute to the production, processing, marketing, distribution, financing and development of agricultural commodities, plant and animal products and other natural resources.

Program Learning Outcomes from the NASDCTE Common Career Technical Core (CCTC): <i>Note: it is expected that a student completing the Program of Studies listed below would transition to post secondary college and career being able to know and do each of these Standards, unless otherwise noted.</i>	
1.	Apply management planning principles in AFNR business.
2.	Use record keeping to accomplish AFNR business objectives, manage budgets, and comply with laws and regulations.
3.	Manage cash budgets, credit budgets and credit for an AFNR business using generally accepted accounting principle.
4.	Develop a business plan for an AFNR business.
5.	Use sales and marketing principles to accomplish AFNR business objectives.

Program of Study Course Sequence for AGRIBUSINESS SYSTEMS				
	9 th Grade	10 th Grade	11 th Grade	12 th Grade
Career and Technical Courses and/or Degree Major Courses as Dual Credit	0133: Intro to the Science of Ag	0136: Applied Science in Ag	0137: Agricultural Leadership/ Communication	0171: Agricultural Economics and Business Management
Suggestions for Enrichment to POS				0191: Ag Internship/OJT/ Coop

Program Learning Outcomes Matrix FOR AGRIBUSINESS SYSTEMS <i>Note: each dot represents the understanding that the student taking that course would have the best opportunity to know and be able to do the CCTC knowledge and skill standards listed above.</i>						
Courses in the POS		Program Learning Outcomes				
STARS No.	Course Title	1	2	3	4	5
0133	Introduction to the Science of Agriculture	•	•	•		•
0136	Applied Science in Agriculture			•		•
0137	Agricultural Leadership/Communication	•	•	•	•	•
0171	Agricultural Economics and Business Management (Capstone Course)	•	•	•	•	•
0191	Agricultural Internship/OJT/Coop	•		•		•

STARS No.	Course Descriptions:
0133	Introduction to the Science of Agriculture - Recommended for Students Grades 9-12. The local, national and global definitions, history and scope of agriculture in society is covered in this course. It also covers plant and animal sciences, production and processing; agricultural mechanics, including tool and machine operation; business and natural resource management; management of food and fiber systems; soil characteristics, formation and properties; and development of leadership and communication skills.
0136	Applied Science in Agriculture - Recommended for Students Grades 10-12. Specific, subject matter covered in this course includes current issues relevant to the agricultural industry, marketing and sales techniques. Disease and parasites effecting the various breeds of livestock; Animal welfare and relationship to the human environment; May include the horticultural practices of greenhouse management; fruit, nut and vegetable production; and landscaping principles; Forest fire prevention and techniques, public and private land forests; Wildfire mammals, waterfowl, freshwater fish and game management.
0137	Agricultural Leadership/Communication - Recommended for Students Grades 10-12. Course is designed to strengthen students' personal and group leadership skills. Topics such as public speaking, effective communication, human relations, parliamentary law, and group dynamics are covered. Also covered is the development of Programs of Activity and Service Learning projects, including student development, chapter development and community development.
0171	Agricultural Economics and Business Management - Recommended for Students Grades 10-11. Course provides students with the information and skills necessary for career success in agribusiness and in the operation of entrepreneurial ventures. Topics include economic principles, budgeting, risk management, finance, business law, insurance and resource management. Other possible topics are development of a business plan, employee/ employer relations, problem solving and decision making, using computers. A survey of the careers within the agriculture industry is also incorporated.
0191	Agricultural Internship/OJT/Coop - Recommended for Students Grades 11-12. Through these courses, work experience is gained within the agricultural industry. Goals are set for the employment period. Classroom experience may involve further study in the field, improvement of employability and career readiness skills.

Animal Systems: Occupations related to the raising and caring of animals and developing more efficient ways of producing and processing meat, poultry, eggs and dairy products. Students study genetics, nutrition, reproduction, growth and care of domesticated farm animals. This includes workers who provide medical service to farm and non-farm animals.

Program Learning Outcomes from the NASDCTE Common Career Technical Core: <i>Note: it is expected that a student completing the Program of Studies listed below would transition to post secondary college and career being able to know and do each of these Standards, unless otherwise noted.</i>	
1.	Analyze historic and current trends impacting the animal systems industry.
2.	Utilize best practice protocols based upon animal behaviors for animal husbandry and welfare.
3.	Design and provide proper animal nutrition to achieve desired outcomes for performance, development and/or economic production.
4.	Apply principles of animal reproduction to achieve desired outcomes for performance, development and/or economic production.
5.	Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.
6.	Classify, evaluate and select animals based on anatomical and physiological characteristics.
7.	Apply principles of effective animal health care.

Program of Studies Course Sequence for ANIMAL SYSTEMS				
	9 th Grade	10 th Grade	11 th Grade	12 th Grade
Career and Technical Courses and/or Degree Major Courses as Dual Credit	0133 Intro to the Science of Ag	0161 Science of Large Ag Animals	0162 Science of Small Animals	0164 Veterinary Science
Additional Courses for Enrichment				0191: Internship/OJT/Coop

Program Learning Outcomes Matrix: <i>Note: each dot represents the understanding that the student taking that course would have the best opportunity to know and be able to do the CCTC knowledge and skill standards listed above.</i>								
Courses in the POS		Program Learning Outcomes						
STARS No.	Course Title	1	2	3	4	5	6	7
0133	Introduction to the Science of Agriculture	•	•				•	
0161	Science of Large Agriculture Animals	•	•	•	•	•	•	•
0162	Science of Small Animals	•	•	•	•	•	•	•
0164	Veterinary Science (Capstone Course)	•	•	•	•	•	•	•
0191	Agricultural Internship/OJT/Coop		•					•

STARS No.	Course Descriptions:
0133	Introduction to the Science of Agriculture: Recommended for Students Grades 9-12. The local, national and global definitions, history and scope of agriculture in society is covered in this course. It also covers plant and animal sciences, production and processing; agricultural mechanics, including tool and machine operation; business and natural resource management; management of food and fiber systems; soil characteristics, formation and properties; and development of leadership and communication skills.
0161	Science of Large Agriculture Animals - Recommended for Students Grades 10-11. Course imparts information about the care and management of domesticated animals. Animal nutrition, health, reproduction, genetics, facilities, and marketing are all possible topics; Study of anatomy and physiology of livestock and other domesticated animals. Examination of developmental stages and analysis of feed ration for different parts of an animal's life cycle. Identification of environmental factors that affect an animal's performance, and recognition of animal behaviors to facilitate working with animals safely.
0162	Science of Small Animals - Recommended for Students Grades 11-12. Course imparts information about the care and management of domesticated animals. Animal nutrition, health, reproduction, genetics, facilities, and marketing are all possible topics; Study of anatomy and physiology of livestock and other domesticated animals. Examination of developmental stages and analysis of feed ration for different parts of an animal's life cycle; Identification of environmental factors that affect an animal's performance; Recognition of animal behaviors to facilitate working with animal safely. Specific focus of this course is on small animals including rabbits, fowl, dogs, and cats.
0164	Veterinary Science - Recommended for Students Grades 10-12. This course will promote Career and Post-Secondary readiness by providing opportunities to develop knowledge and demonstrate skills in the area of Veterinary Science. Subject matter areas include, animal behavior, medical terminology, health records, anatomy and physiology as well as patient and facility care.
0191	Agricultural Internship/OJT/Coop - Recommended for Students Grades 11-12. Through these courses, work experience is gained within the agricultural industry. Goals are set for the employment period. Classroom experience may involve further study in the field, improvement of employability and career readiness skills.

Environmental Service Systems: Occupations involved in water and air pollution control, recycling, waste disposal and public health issues. Instruction includes waste management, research and quality control.

Program Learning Outcomes from the NASDCTE Common Career Technical Core: <i>Note: it is expected that a student completing the Program of Studies listed below would transition to post secondary college and career being able to know and do each of these Standards, unless otherwise noted.</i>	
1.	Use analytical procedures and instruments to manage environmental service systems.
2.	Evaluate the impact of public policies and regulations on environmental service system operations.
3.	Develop proposed solutions to environmental issues, problems and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry and ecology.
4.	Demonstrate the operation of environmental service systems (e.g., pollution control, water treatment, wastewater treatment, solid waste management and energy conservation).
5.	Use tools, equipment, machinery and technology common to tasks in environmental service systems.

Program of Studies Course Sequence for Environmental Service Systems				
	9 th Grade	10 th Grade	11 th Grade	12 th Grade
Career and Technical Courses and/or Degree Major Courses as Dual Credit	0133: Intro to the Science of Ag	0134: Intro to the Physical Science of Ag	0136: Applied Science of Agriculture	0181: Environmental Science/Natural Resources
Additional Courses for Enrichment				0191: Ag Internship/OJT/Coop

Program Learning Outcomes Matrix FOR ENVIRONMENTAL SERVICE SYSTEMS <i>Note: each dot represents the understanding that the student taking that course would have the best opportunity to know and be able to do the CCTC knowledge and skill standards listed above.</i>						
Courses in the POS		Program Learning Outcomes				
STARS No.	Course Title	1	2	3	4	5
0133	Introduction to the Science of Agriculture		•			•
0134	Introduction to the Physical Science of Agriculture	•		•	•	•
0136	Applied Science of Agriculture	•	•	•	•	•
0181	Environmental Science/Natural Resources		•	•	•	•
0191	Agricultural Internship/OJT/Coop	•				•

STARS No.	Course Descriptions:
0133	Introduction to the Science of Agriculture - Recommended for Students Grades 9-12. The local, national and global definitions, history and scope of agriculture in society is covered in this course. It also covers plant and animal sciences, production and processing; agricultural mechanics, including tool and machine operation; business and natural resource management; management of food and fiber systems; soil characteristics, formation and properties; and development of leadership and communication skills.
0134	Introduction to the Physical Science of Agriculture - Recommended for Students Grades 10-12. The course covers the global market place, development of a Program of Activities, and leadership development. Animal science emphasis is on the selection, reproduction and genetics of breeds of beef, sheep, and swine, dairy cattle, horses, poultry, and specialty animals. Plant science emphasis is on the structure and function of plant parts; identification of common pasture and range plants; plant growth and development; sexual and asexual reproduction of plants. Soil science topics include nutrients, fertilizers, and organic matter; conservation practices and sampling techniques.
0136	Applied Science in Agriculture - Recommended for Students Grades 10-12. Specific subject matter covered in this course includes current issues relevant to the agricultural industry, marketing and sales techniques. Disease and parasites effecting the various breeds of livestock; Animal welfare and relationship to the human environment; May include the horticultural practices of greenhouse management; fruit, nut and vegetable production; and landscaping principles; Forest fire prevention and techniques, public and private land forests; Wildlife mammals, waterfowl, freshwater fish, and game management.
0181	Environmental Science/Natural Resources - Recommended for Students Grades 10-12. Course combines the fields of ecology and conservation with planning for the efficient use and preservation of land, water, wildlife, and forests. Within this course may be topics covering environmental factors affecting water, water pollution, water and land use management, alternative energy resources, metals and minerals.
0191	Agricultural Internship/OJT/Coop - Recommended for Students Grades 11-12. Through these courses, work experience is gained within the agricultural industry. Goals are set for the employment period. Classroom experience may involve further study in the field, improvement of employability and career readiness skills.

Food Products and Processing Systems: Occupations involved in bulk food production, the discovery of new food sources, the analysis of food content and the development of ways to process, preserve, package or store food according to consumer needs; includes those who monitor compliance with industry and government regulations.

Program Learning Outcomes from the NASDCTE Common Career Technical Core: <i>Note: it is expected that a student completing the Program of Studies listed below would transition to post secondary college and career being able to know and do each of these Standards, unless otherwise noted.</i>	
1.	Develop and implement procedures to ensure safety, sanitation and quality in food product and processing facilities.
2.	Apply principles of nutrition, biology, microbiology, chemistry and human behavior to the development of food products.
3.	Select and process food products for storage, distribution and consumption.
4.	Explain the scope of the food industry and the historical and current developments of food products and processing.

Program of Studies Course Sequence for FOOD PRODUCTS AND PROCESSING SYSTEMS				
	9 th Grade	10 th Grade	11 th Grade	12 th Grade
Career and Technical Courses and/or Degree Major Courses as Dual Credit	0133: Intro to the Science of Ag	0136: Applied Science of Agriculture	0161: Large Ag Animals	0173: Products and Processing
Additional Courses for Enrichment				0191: Ag Internship/OJT/Coop

Program Learning Outcomes Matrix: <i>Note: each dot represents the understanding that the student taking that course would have the best opportunity to know and be able to do the CCTC knowledge and skill standards listed above.</i>					
Courses in the POS		Program Learning Outcomes			
STARS No.	Course Title	1	2	3	4
0133	Introduction to the Science of Agriculture	•	•		
0136	Applied Science of Agriculture	•	•		
0161	Large Ag Animals	•			•
0173	Products and Processing	•	•	•	•
0191	Agricultural Internship/OJT/Coop	•			•

STARS No.	Course Descriptions:
0133	Introduction to the Science of Agriculture - Recommended for Students Grades 9-12. The local, national and global definitions, history and scope of agriculture in society is covered in this course. It also covers plant and animal sciences, production and processing; agricultural mechanics, including tool and machine operation; business and natural resource management; management of food and fiber systems; soil characteristics, formation and properties; and development of leadership and communication skills.
0136	Applied Science of Agriculture - Recommended for Students Grades 10-12. Specific subject matter covered in this course includes current issues relevant to the agricultural industry, marketing and sales techniques. Disease and parasites effecting the various breeds of livestock; Animal welfare and relationship to the human environment; May include the horticultural practices of greenhouse management; fruit, nut and vegetable production; and landscaping principles; Forest fire prevention and techniques, public and private land forests; Wildlife mammals, waterfowl, freshwater fish, and game management.
0161	Science of Large Agriculture Animals - Recommended for Students Grades 10-11. Course imparts information about the care and management of domesticated animals. Animal nutrition, health, reproduction, genetics, facilities, and marketing are all possible topics; Study of anatomy and physiology of livestock and other domesticated animals. Examination of developmental stages and analysis of feed ration for different parts of an animal's life cycle. Identification of environmental factors that affect an animal's performance, and recognition of animal behaviors to facilitate working with animals safely.
0173	Science of Food Products and Food Processing - Recommended for Students Grades 10-12. Course imparts the knowledge and skill needed to bring animal and plant products to market. Processing topics will include quality selection and preservation, equipment care and sanitation, government regulations, and consumer trends.
0191	Agricultural Internship/OJT/Coop - Recommended for Students Grades 11-12. Through these courses, work experience is gained within the agricultural industry. Goals are set for the employment period. Classroom experience may involve further study in the field, improvement of employability and career readiness skills.

Natural Resources Systems: Occupations that develop, use, maintain and analyze natural resources. Instruction may relate to recreation, wildlife, conservation, mining, logging or oil drilling.

Program Learning Outcomes from the NASDCTE Common Career Technical Core:	
<i>Note: it is expected that a student completing the Program of Studies listed below would transition to post secondary college and career being able to know and do each of these Standards, unless otherwise noted.</i>	
1.	Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.
2.	Analyze the interrelationships between natural resources and humans.
3.	Develop plans to ensure sustainable production and processing of natural resources.
4.	Demonstrate responsible management procedures and techniques to protect or maintain natural resources.

Program of Studies Course Sequence for NATURAL RESOURCES SYSTEMS				
	9 th Grade	10 th Grade	11 th Grade	12 th Grade
Career and Technical Courses and/or Degree Major Courses as Dual Credit	0133: Intro to the Science of Ag	0136: Applied Science in Ag	0181: Environmental Science/Natural Resources	0182: Science of Wildlife and Forestry Management
Additional Courses for Enrichment			0134: Intro to the Physical Science of Ag	0191: Internship/OJT/Coop

Program Learning Outcomes Matrix OR NATURAL RESOURCES SYSTEMS					
<i>Note: each dot represents the understanding that the student taking that course would have the best opportunity to know and be able to do the CCTC knowledge and skill standards listed above.</i>					
Courses in the POS		Program Learning Outcomes			
STARS No.	Course Title	1	2	3	4
0133	Introduction to the Science of Agriculture		•		
0134	Introduction to the Physical Science of Agriculture		•		
0136	Applied Science of Agriculture		•		•
0181	Wildlife and Forestry (Capstone Course)	•	•	•	•
0182	Science of Wildlife and Forestry Management	•	•	•	•
0191	Agricultural Internship/OJT/Coop	•			•

STARS No.	Course Descriptions:
0133	Introduction to the Science of Agriculture - Recommended for Students Grades 9-12. The local, national and global definitions, history and scope of agriculture in society is covered in this course. It also covers plant and animal sciences, production and processing; agricultural mechanics, including tool and machine operation; business and natural resource management; management of food and fiber systems; soil characteristics, formation and properties; and development of leadership and communication skills.
0134	Introduction to the Physical Science of Agriculture - Recommended for Students Grades 10-12. The course covers the global market place, development of a Program of Activities, and leadership development. Animal science emphasis is on the selection, reproduction and genetics of breeds of beef, sheep, and swine, dairy cattle, horses, poultry, and specialty animals. Plant science emphasis is on the structure and function of plant parts; identification of common pasture and range plants; plant growth and development; sexual and asexual reproduction of plants. Soil science topics include nutrients, fertilizers, and organic matter; conservation practices and sampling techniques.
0136	Applied Science of Agriculture - Recommended for Students Grades 10-12. Specific subject matter covered in this course includes current issues relevant to the agricultural industry, marketing and sales techniques. Disease and parasites effecting the various breeds of livestock; Animal welfare and relationship to the human environment; May include the horticultural practices of greenhouse management; fruit, nut and vegetable production; and landscaping principles; Forest fire prevention and techniques, public and private land forests; Wildlife mammals, waterfowl, freshwater fish, and game management.
0181	Environmental Science/Natural Resources - Recommended for Students Grades 10-12. Course combines the fields of ecology and conservation with planning for the efficient use and preservation of land, water, wildlife, and forests. Within this course may be topics covering environmental factors affecting water, water pollution, water and land use management, alternative energy resources, metals and minerals.
0182	Science of Wildlife and Forestry Management - Recommended for Students Grades 10-12. Course provides the information necessary for the cultivation and care of forests or timberlands. Forestry topics covered are the processes of regeneration and reforestation, conservation of natural resources, erosion control, trail development and maintenance, mapping and surveying, operation of forestry tools, government regulations, and recreational uses. Wildlife topics include land and ecological systems that enable non-domesticated animal to thrive. Emphasize on how humans and animals may both take advantage of the same land, how to gain economic benefits from the land while not degrading its natural resources or depleting the plant and animal populations.
0191	Agricultural Internship/OJT/Coop - Recommended for Students Grades 11-11. Through these courses, work experience is gained within the agricultural industry. Goals are set for the employment period. Classroom experience may involve further study in the field, improvement of employability and career readiness skills.

Plant Systems: Occupations related to growing food, feed and fiber crops, and the study of plants and their growth to help producers meet consumer demand while conserving natural resources and maintaining the environment, advanced instruction includes the study of data and techniques of applied science for the solution of problems concerning living organisms.

Program Learning Outcomes from the NASDCTE Common Career Technical Core:
Note: it is expected that a student completing the Program of Studies listed below would transition to post secondary college and career being able to know and do each of these Standards, unless otherwise noted.

1.	Develop and implement a crop management plan for a given production goal that accounts for environmental factors.
2.	Apply the principles of classification, plant anatomy and plant physiology to plant production and management.
3.	Propagate, culture and harvest plants and plant products based on current industry standards.
4.	Apply principles of design in plant systems to enhance an environment (e.g., Floral, forest,

Program of Studies Course Sequence for PLANT SYSTEMS

	9 th Grade	10 th Grade	11 th Grade	12 th Grade
Career and Technical Courses and/or Degree Major Courses as Dual Credit	0133: Intro to the Science of Ag	0141: Horticulture/ Botany	0143: Greenhouse/ Nursery Operations	0145: Floriculture
Additional Courses for Enrichment		0134: Intro to the Physical Science of Ag	0144: Landscape	0191: Ag Internship/OJT/ Coop

Program Learning Outcomes Matrix FOR PLANT SYSTEMS

Note: each dot represents the understanding that the student taking that course would have the best opportunity to know and be able to do the CCTC knowledge and skill standards listed above.

Courses in the POS		Program Learning Outcomes			
STARS No.	Course Title	1	2	3	4
0133	Introduction to the Science of Agriculture	•	•	•	
0134	Introduction to the Physical Science of Agriculture	•	•	•	•
0141	Science-Horticulture/Botany	•	•	•	•
0143	Greenhouse/Nursery Operations	•	•	•	•
0144	Landscape		•		•
0145	Floriculture		•	•	•
0191	Agriculture Internship/OJT/Coop	•			•

STARS No.	Course Descriptions:
0133	Introduction to the Science of Agriculture - Recommended for Students Grades 9-12. The local, national and global definitions, history and scope of agriculture in society is covered in this course. It also covers plant and animal sciences, production and processing; agricultural mechanics, including tool and machine operation; business and natural resource management; management of food and fiber systems; soil characteristics, formation and properties; and development of leadership and communication skills.
0134	Introduction to the Physical Science of Agriculture - Recommended for Students Grades 10-12. The course covers the global market place, development of a Program of Activities, and leadership development. Animal science emphasis is on the selection, reproduction and genetics of breeds of beef, sheep, and swine, dairy cattle, horses, poultry, and specialty animals. Plant science emphasis is on the structure and function of plant parts; identification of common pasture and range plants; plant growth and development; sexual and asexual reproduction of plants. Soil science topics include nutrients, fertilizers, and organic matter; conservation practices and sampling techniques.
0141	Science-Horticulture/Botany - Recommended for Students Grades 9-12. The focus of this course is on the science of plants (botany). Specific topics include photosynthesis and respiration, analysis of the difference of plant and animal cell structure, genetics, taxonomy and classification. Also included are topics covering entomology, soil chemistry, and plant diseases; virus and bacteria life cycles and effects on plant growth. Focus is on horticultural crops including greenhouse, landscape and floral plants.
0143	Greenhouse/Nursery Operations - Recommended for Students Grades 10-12. This course covers greenhouse/nursery operation and management. Plant propagation including grafting, budding, and layering. Students are often involved in the planning, management, and marketing associated with the school greenhouse/nursery.
0144	Landscape - Recommended for Students Grades 10-12. Introduction to landscape design, construction, and maintenance. Irrigation systems for the landscape, including water conservation and use, and xeriscape for plants. Drawing instruments and symbols used in designing the landscape plan, identification and selection of landscape ground covers, shrubs, trees, and other construction materials. Cost estimates and landscaped proposals are also covered in this course.
0145	Floriculture - Recommended for Students Grades 10-12. Focus is on the floriculture industry including plant production, processing, marketing, and principles of floral design. Students are often involved in a simulated floral shop on the school grounds. Interior plantscaping may also be included in this course.
0191	Agricultural Internship/OJT/Coop - Recommended for Students Grades 11-12. Through these courses, work experience is gained within the agricultural industry. Goals are set for the employment period. Classroom experience may involve further study in the field, improvement of employability and career readiness skills.

Power, Structural and Technical Systems: Workers apply knowledge of engineering, hydraulics, pneumatics, electronics, power, structures, and controls to the field of agriculture. They design agricultural structures as well as machinery and equipment.

Program Learning Outcomes from the NASDCTE Common Career Technical Core:

Note: it is expected that a student completing the Program of Studies listed below would transition to post secondary college and career being able to know and do each of these Standards, unless otherwise noted.

1.	Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.
2.	Operate and maintain AFNR mechanical equipment and power systems.
3.	Service and repair AFNR mechanical equipment and power systems.
4.	Plan, build and maintain AFNR structures.
5.	Use control, monitoring, geospatial and other technologies in AFNR power, structural and technical systems.

Program of Study Course Sequence for POWER, STRUCTURAL AND TECHNICAL SYSTEMS

	9 th Grade	10 th Grade	11 th Grade	12 th Grade
Career and Technical Courses and/or Degree Major Courses as Dual Credit	0151: Intro to Ag Mechanics	0152: Ag Structures and Construction	0153: Metal Fabrication	0154: Ag Power and Machinery
Additional Courses for Enrichment	0133: Intro to the Science of Ag			0191: Ag Internship/OJT/Coop

Program Learning Outcomes Matrix FOR POWER, STRUCTURAL AND TECHNICAL SYSTEMS

Note: each dot represents the understanding that the student taking that course would have the best opportunity to know and be able to do the CCTC knowledge and skill standards listed above.

Courses in the POS		Program Learning Outcomes				
STARS No.	Course Title	1	2	3	4	5
0133	Introduction to the Science of Agriculture	•				
0151	Introduction to Agriculture Mechanics	•	•			
0152	Agricultural Structures and Construction	•	•	•	•	
0153	Metal Fabrication for the Agricultural Industry	•	•	•	•	
0154	Agricultural Power and Machinery	•	•	•	•	
0191	Agricultural Internship/OJT/Coop	•			•	•

STARS No.	Course Descriptions:
0133	Introduction to the Science of Agriculture: - Recommended for Students Grades 9-12. The local, national and global definitions, history and scope of agriculture in society is covered in this course. It also covers plant and animal sciences, production and processing; agricultural mechanics, including tool and machine operation; business and natural resource management; management of food and fiber systems; soil characteristics, formation and properties; and development of leadership and communication skills.
0151	Introduction to Agricultural Mechanics - Recommended for Students Grades 9-12. Course provides for the skill and knowledge development applicable to the tools and equipment used in the agricultural industry. In learning to apply basic industrial knowledge and skills (engines, power, welding, and carpentry), a broad range of topics may be explored, including the operation, mechanics, and care of tools and machines; the construction and repair of structures; introduction to electricity and power. Procedures for safe operations in the agricultural mechanics laboratory are included in this course.
0152	Agricultural Structures and Construction - Recommended for Students Grades 10-12. Topics include surveying, concrete and masonry, plumbing, drafting, carpentry and electrical wiring; use of bids and billing information to develop a complete materials list and project cost estimate; use of measurement and layout tools. Procedures for safe operations in the agricultural mechanics laboratory are included in this course.
0153	Metal Fabrication for the Agricultural Industry - Recommended for Students Grades 10-12. Topics include oxyacetylene and mig welding techniques including cutting, brazing, and welding; Fabrication techniques and project design including estimating and developing materials list. Tool room management and safety procedures are essential to the course.
0154	Agricultural Power and Machinery - Recommended for Students Grades 10-12. The course includes maintenance and troubleshooting, and repair of small gas engines, auto and farm equipment maintenance; Identification and comparison of energy sources. Troubleshoot problems and evaluate performance to service and repair components of internal combustion engines. Follow manufacturers' guidelines to service and repair power transmission systems. Utilize maintenance manuals to service and repair hydraulic systems. Utilize schematics to service vehicle electrical systems.
0191	Agricultural Internship/OJT/Coop - Recommended for Students Grades 11-12. Through these courses, work experience is gained within the agricultural industry. Goals are set for the employment period. Classroom experience may involve further study in the field, improvement of employability and career readiness skills.