Revised–May 2024

Agriculture, Food, and Natural Resources Career Cluster

The Agriculture, Food, and Natural Resources (AFNR) career cluster focuses on the essential elements of life, food, water, land, and air. This career cluster includes occupations ranging from farmer, rancher, and veterinarian to geologist, land conservationist, and florist.

Statewide Program of Study: Agricultural Technology and Mechanical Systems

The Agricultural Technology and Mechanical Systems program of study focuses on occupational and educational opportunities associated with applying engineering technology and biological science to agricultural problems related to power and machinery, electrification, structures, soil and water use, and processing agricultural products. This program of study includes diagnosing, repairing, or overhauling farm machinery and vehicles, such as tractors, harvesters, dairy equipment, and irrigation systems.

Secondary Courses for High School Credit

Level 1
- Principles of Agriculture, Food, and Natural Resources

Level 2
- Agricultural Mechanics and Metal Technologies
- Agricultural Mechanics and Metal Technologies + Agricultural Laboratory and Field Experience

Level 3
- Agricultural Structures Design and Fabrication
- Agricultural Structures Design and Fabrication + Agricultural Laboratory and Field Experience
- Agricultural Power Systems
- Agricultural Power Systems + Agricultural Laboratory and Field Experience
- Geographic Information Systems (GIS) for Agriculture

Level 4
- Advanced Agriculture Power Systems (TBD)
- Agricultural Equipment Design and Fabrication
- Agricultural Equipment Design and Fabrication + Agricultural Laboratory and Field Experience
- Career and Technology Project-Based Capstone
- Practicum in Agriculture, Food, and Natural Resources
- Practicum in Agriculture, Food, and Natural Resources + Extended Practicum in Agriculture, Food, and Natural Resources
- Career Preparation for Programs of Study
- Career Preparation for Programs of Study + Extended Career Preparation
- Scientific Research and Design

Aligned Advanced Academic Courses

Dual Credit	Dual credit offerings will vary by local education agency.

Students should be advised to consider these course opportunities to enrich their preparation. AP or IB courses not listed under the Secondary Courses for High School Credit section of this framework document do not count towards concentrator/completer status for this program of study.

Work-Based Learning and Expanded Learning Opportunities

Work-Based Learning Activities	• Participate in a farm mechanic apprenticeship at an equipment production company • Intern at an equipment manufacturing facility working with agricultural engineers
Expanded Learning Opportunities	• Participate in an FFA career, leadership, and speaking contest like an agriscience fair • Participate in an agriculture robotics event

Aligned Industry-Based Certifications

- Agriculture Mechanics
- API 1104 Welding Pipelines and Related Facilities
- AWS Certified Welder
- AWS D1.1 Structural Steel
- AWS D9.1 Sheet Metal Welding
- AWS SENSE Level I: Entry Welder
- Feedyard Technician in Machinery Operation, Repair and Maintenance
- Machining Measurement, Material, and Safety Level I
- NCCER Core
- NCCER Welding Level I
- Welding - Job Ready
- Industrial Technology Maintenance (ITM) - Basic Pneumatic Systems
- Industrial Technology Maintenance (ITM) – Maintenance Welding

TEA Texas Education Agency

Successful completion of the Agricultural Technology and Mechanical Systems program of study will fulfill requirements of the Business and Industry endorsement.

Example Postsecondary Opportunities

Apprenticeships
- Farm Equipment Mechanic I

Associate Degrees
- Diesel Mechanics Technology
- Industrial Mechanics and Maintenance Technology

Bachelor's Degrees
- Agricultural Engineering
- Agricultural Systems Management

Master's, Doctoral, and Professional Degrees
- Agricultural Engineering
- Industrial Technology

Additional Stackable IBCs/License
- Diesel Equipment Technology-Off Highway Specialization CER1
- Accredited Farm Manager

Example Aligned Occupations

Farm Equipment Mechanics and Service Technicians
Median Wage: $46,582
Annual Openings: 326
10-Year Growth: 23%

Mobile Heavy Equipment Mechanics
Median Wage: $57,943
Annual Openings: 2,637
10-Year Growth: 31%

Farmers, Ranchers, and Other Agricultural Managers
Median Wage: $65,490
Annual Openings: 28,020
10-Year Growth: 4%

Data Source: TexasWages, Texas Workforce Commission. Retrieved 3/8/2024.

For more information visit:
https://tea.texas.gov/academics/college-career-and-military-prep/career-and-technical-education/programs-of-study-additional-resources

Agricultural Technology and Mechanical Systems

Agriculture, Food, and Natural Resources Career Cluster

Statewide Program of Study: Agricultural Technology and Mechanical Systems

Course Information

Level 1

Course	Prerequisites | Corequisites	Career Clusters
Principles of Agriculture, Food, and Natural Resources* 13000200 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	

Level 2

Course	Prerequisites | Corequisites	Career Clusters
Agricultural Mechanics and Metal Technologies 13002200 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Principles of AFNR **Recommended Corequisites:** None	
Agricultural Mechanics and Metal Technologies + Agricultural Laboratory and Field Experience 13002210 (2 credits)	**Prerequisites:** None **Corequisites:** Agricultural Mechanics and Metal Technologies **Recommended Prerequisites:** Principles of AFNR **Recommended Corequisites:** None	

Level 3

Course	Prerequisites | Corequisites	Career Clusters
Agricultural Structures Design and Fabrication 13002300 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Agricultural Mechanics and Metal Technologies **Recommended Corequisites:** None	
Agricultural Structures Design and Fabrication + Agricultural Laboratory and Field Experience 13002310 (2 credits)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Agricultural Mechanics and Metal Technologies **Recommended Corequisites:** None	
Agricultural Power Systems 13002400 (2 credits)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Principles of AFNR **Recommended Corequisites:** None	
Agricultural Power Systems + Agricultural Laboratory and Field Experience 13002410 (3 credits)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Principles of AFNR **Recommended Corequisites:** None	

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** Indicates course is included in more than one program of study.*

For additional information on the **Agriculture, Food, and Natural Resources** career cluster, contact cte@tea.texas.gov or visit https://tea.texas.gov/cte

Agriculture, Food, and Natural Resources Career Cluster

Statewide Program of Study: Agricultural Technology and Mechanical Systems

Course Information

Level 3

Course	Prerequisites | Corequisites	Career Clusters
Geographic Information Systems (GIS) for Agriculture N1300272 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Principles of AFNR **Recommended Corequisites:** None	

Level 4

Course	Prerequisites | Corequisites	Career Clusters
Advanced Agriculture Power Systems TBD (TBD credit)	**Prerequisites:** TBD **Corequisites:** TBD **Recommended Prerequisites:** TBD **Recommended Corequisites:** TBD	
Agricultural Equipment Design and Fabrication 13002350 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Agricultural Mechanics and Metal Technologies **Recommended Corequisites:** None	
Agricultural Equipment Design and Fabrication + Agricultural Laboratory and Field Experience 13002360 (2 credits)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Agricultural Mechanics and Metal Technologies **Recommended Corequisites:** None	
Career and Technical Education Project-Based Capstone* First Time Taken: 12701101 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Practicum in Agriculture, Food, and Natural Resources* First Time Taken: 13002500 (2 credits) Second Time Taken: 13002510 (2 credits)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** A minimum of one credit from the courses in the AFNR career cluster **Recommended Corequisites:** None	

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Statewide Program of Study: Agricultural Technology and Mechanical Systems

Course Information

Level 4

Course	Prerequisites | Corequisites	Career Clusters
Practicum in Agriculture, Food, and Natural Resources + Extended Practicum in Agriculture, Food, and Natural Resources* First Time Taken: 13002505 (3 credits) Second Time Taken: 13002515 (3 credits)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** A minimum of one credit from the courses in the AFNR career cluster **Recommended Corequisites:** None	
Career Preparation for Programs of Study* First Time Taken: 12701121 (2 credits)	**Prerequisites**: At least one Level 2 or higher CTE course **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Career Preparation for Programs of Study + Extended Career Preparation* First Time Taken: 12701141 (3 credits)	**Prerequisites:** At least one Level 2 or higher CTE course **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Scientific Research and Design* 13037200 (1 credit)	**Prerequisites:** Biology, Chemistry, Integrated Physics and Chemistry (IPC), or Physics **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	

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