



# 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

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|----------------|--|
| <b>Level 1</b> | <ul style="list-style-type: none"> <li>Principles of Agriculture, Food, and Natural Resources</li> </ul>   |
| <b>Level 2</b> | <ul style="list-style-type: none"> <li>Agricultural Mechanics and Metal Technologies</li> <li>Agricultural Mechanics and Metal Technologies + Agricultural Laboratory and Field Experience</li> </ul>  |
| <b>Level 3</b> | <ul style="list-style-type: none"> <li>Agricultural Structures Design and Fabrication</li> <li>Agricultural Structures Design and Fabrication + Agricultural Laboratory and Field Experience</li> <li>Agricultural Power Systems</li> <li>Agricultural Power Systems + Agricultural Laboratory and Field Experience</li> <li>Geographic Information Systems (GIS) for Agriculture</li> </ul>   |
| <b>Level 4</b> | <ul style="list-style-type: none"> <li>Advanced Agriculture Power Systems (TBD)</li> <li>Agricultural Equipment Design and Fabrication</li> <li>Agricultural Equipment Design and Fabrication + Agricultural Laboratory and Field Experience</li> <li>Career and Technology Project-Based Capstone</li> <li>Practicum in Agriculture, Food, and Natural Resources</li> <li>Practicum in Agriculture, Food, and Natural Resources + Extended Practicum in Agriculture, Food, and Natural Resources</li> <li>Career Preparation for Programs of Study</li> <li>Career Preparation for Programs of Study + Extended Career Preparation</li> <li>Scientific Research and Design</li> </ul> |

### 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

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|--|---|
| <ul style="list-style-type: none"> <li>Agriculture Mechanics</li> <li>API 1104 Welding Pipelines and Related Facilities</li> <li>AWS Certified Welder</li> <li>AWS D1.1 Structural Steel</li> <li>AWS D9.1 Sheet Metal Welding</li> <li>AWS SENSE Level I: Entry Welder</li> <li>Feedyard Technician in Machinery Operation, Repair and Maintenance</li> </ul> | <ul style="list-style-type: none"> <li>Machining Measurement, Material, and Safety Level I</li> <li>NCCER Core</li> <li>NCCER Welding Level I</li> <li>Welding - Job Ready</li> <li>Industrial Technology Maintenance (ITM) - Basic Pneumatic Systems</li> <li>Industrial Technology Maintenance (ITM) - Maintenance Welding</li> </ul> |
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### 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>



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## Statewide Program of Study: Agricultural Technology and Mechanical Systems

### Course Information

	Course	Prerequisites   Corequisites	Career Clusters
Level 1	<b>Principles of Agriculture, Food, and Natural Resources*</b> 13000200 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	
	<b>Agricultural Mechanics and Metal Technologies</b> 13002200 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Principles of AFNR <b>Recommended Corequisites:</b> None	
Level 2	<b>Agricultural Mechanics and Metal Technologies + Agricultural Laboratory and Field Experience</b> 13002210 (2 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> Agricultural Mechanics and Metal Technologies <b>Recommended Prerequisites:</b> Principles of AFNR <b>Recommended Corequisites:</b> None	
	<b>Agricultural Structures Design and Fabrication</b> 13002300 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Agricultural Mechanics and Metal Technologies <b>Recommended Corequisites:</b> None	
Level 3	<b>Agricultural Structures Design and Fabrication + Agricultural Laboratory and Field Experience</b> 13002310 (2 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Agricultural Mechanics and Metal Technologies <b>Recommended Corequisites:</b> None	
	<b>Agricultural Power Systems</b> 13002400 (2 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Principles of AFNR <b>Recommended Corequisites:</b> None	
	<b>Agricultural Power Systems + Agricultural Laboratory and Field Experience</b> 13002410 (3 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Principles of AFNR <b>Recommended Corequisites:</b> 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](mailto:cte@tea.texas.gov) or visit <https://tea.texas.gov/cte>



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# 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
<b>Geographic Information Systems (GIS) for Agriculture</b> N1300272 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Principles of AFNR <b>Recommended Corequisites:</b> None	

Level 4

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

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Agricultural Technology and Mechanical Systems

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## Statewide Program of Study: Agricultural Technology and Mechanical Systems

### Course Information

Level 4

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

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