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 a diverse spectrum of occupations, ranging from farmer, rancher, and veterinarian to geologist, land conservationist, and florist. It also includes non-traditional agricultural occupations like wind energy, solar energy, and oil and gas production.

**Secondary Courses for High School Credit**

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

**Level 2**
- Agricultural Mechanics and Metal Technologies/Lab

**Level 3**
- Agricultural Structures Design and Fabrications/Lab
- Agricultural Power Systems/Lab
- Geographic Information Systems for Agriculture

**Level 4**
- Agricultural Equipment Design and Fabrication/Lab
- Practicum in Agriculture, Food, and Natural Resources
- Project-Based Research
- Scientific Research and Design

**Postsecondary Opportunities**

**Associates Degrees**
- Heavy Equipment Maintenance Technology/Technician
- Agricultural Mechanization, General
- Small Engine Mechanics and Repair Technology/Technician
- Welding Technology/Welder

**Bachelor’s Degrees**
- Agricultural Engineering
- Agricultural Mechanization, General

**Master’s, Doctoral, and Professional Degrees**
- Agricultural Engineering
- Agricultural Mechanization, General

**Work-Based Learning and Expanded Learning Opportunities**

<table>
<thead>
<tr>
<th>Exploration Activities</th>
<th>Work-Based Learning Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tour a farm products or machinery plant</td>
<td>Earn a welding certification</td>
</tr>
<tr>
<td>Participate in Texas FFA</td>
<td>Intern at a farm products or machinery plant</td>
</tr>
<tr>
<td>Participate in an FFA supervised agriculture experience</td>
<td></td>
</tr>
</tbody>
</table>

**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 1: Entry Welder
- Feedyard Technician in Machinery Operation, Repair and Maintenance
- Industrial Technology Maintenance (ITM) - Maintenance Welding
- Machining Measurement, Material, and Safety Level I
- NCCER Welding Level I
- NCCER Core
- General Welding - Job Ready

- OSHA General 30*

*IBC sunsetting 8/31/24

**Aligned Occupations**

<table>
<thead>
<tr>
<th>Occupations</th>
<th>Median Wage</th>
<th>Annual Openings</th>
<th>% Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor Power Equipment and Other Small Engine Mechanics</td>
<td>$32,406</td>
<td>366</td>
<td>16%</td>
</tr>
<tr>
<td>Welders</td>
<td>$41,350</td>
<td>6171</td>
<td>9%</td>
</tr>
<tr>
<td>Farm Equipment Mechanics and Service Technicians</td>
<td>$39,915</td>
<td>304</td>
<td>17%</td>
</tr>
<tr>
<td>Mobile Heavy Equipment Mechanics</td>
<td>$47,299</td>
<td>1627</td>
<td>16%</td>
</tr>
<tr>
<td>Agricultural Engineers</td>
<td>$64,792</td>
<td>9</td>
<td>13%</td>
</tr>
</tbody>
</table>

Successful completion of the Applied Agricultural Engineering program of study will fulfill requirements of a Business and Industry endorsement or STEM endorsement if the math and science requirements are met. Revised – October 2022
# Applied Agricultural Engineering

## Course Information

### Level 1

<table>
<thead>
<tr>
<th>COURSE NAME</th>
<th>SERVICE ID</th>
<th>PREREQUISITES</th>
<th>COREQUISITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principles of Agriculture, Food, and Natural Resources</td>
<td>13000200 (1 credit)</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

### Level 2

<table>
<thead>
<tr>
<th>COURSE NAME</th>
<th>SERVICE ID</th>
<th>PREREQUISITES</th>
<th>COREQUISITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Mechanics and Metal Technologies/Lab</td>
<td>13002200 (1 credit)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>13002210 (2 credits)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Level 3

<table>
<thead>
<tr>
<th>COURSE NAME</th>
<th>SERVICE ID</th>
<th>PREREQUISITES</th>
<th>COREQUISITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Structures Design and Fabrications/Lab</td>
<td>13002300 (1 credit)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>13002310 (2 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Power Systems/Lab</td>
<td>13002400 (2 credits)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>13002410 (3 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geographic Information Systems for Agriculture</td>
<td>N1300272 (1 credit)</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

### Level 4

<table>
<thead>
<tr>
<th>COURSE NAME</th>
<th>SERVICE ID</th>
<th>PREREQUISITES</th>
<th>COREQUISITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Equipment Design and Fabrication/Lab</td>
<td>13002350 (1 credit)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>13002360 (2 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practicum in Agriculture, Food, and Natural Resources</td>
<td>13002500 (2 credits)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>13002505 (3 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13002510 (2 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13002515 (3 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project-Based Research</td>
<td>12701500 (1 credit)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Scientific Research and Design</td>
<td>13037200 (1 credit)</td>
<td>Biology, Chemistry, Integrated Physics, and Chemistry (IPC), or Physics</td>
<td></td>
</tr>
</tbody>
</table>

For additional information on the Agriculture, Food, and Natural Resource Career Cluster, please contact: [CTE@tea.texas.gov](mailto:CTE@tea.texas.gov)

Further nondiscrimination information can be found at [Notification of Nondiscrimination in Career and Technical Education Programs](https://tea.texas.gov/cte).