# 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 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.

Applied Agricultural Engineering
Statewide Program of Study
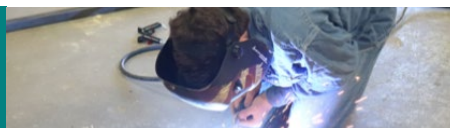
The Applied Agricultural Engineering program of study explores the occupations and educational opportunities associated with applying knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing agricultural products. This program of study may also include exploration into 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/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, Genera

Work-Based Learning and Expanded Learning Opportunities

Exploration Activities	Work-Based Learning Activities
- Tour a farm products or machinery plant - Participate in Texas FFA	- Earn a welding certification - Intern at a farm products or machinery plant - Participate in an FFA supervised agriculture experience

Industry-Based Certifications

- Agriculture Mechanics
- API 1104 Welding Pipelines and Related Facilities AWS Certified Welder
- 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

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

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

COURSE NAME	SERVICE ID	PREREQUISITES	COREQUISITES
Principles of Agriculture, Food, and Natural Resources	13000200 (1 credit)	None	None

Level 2

COURSE NAME	SERVICE ID	PREREQUISITES	COREQUISITES
Agricultural Mechanics and Metal Technologies/Lab	13002200 (1 credit) 13002210 (2 credits)	None	None

Level 3

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

Level 4

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

FOR ADDITIONAL INFORMATION ON THE AGRICULTURE, FOOD, AND NATURAL RESOURCE CAREER CLUSTER, PLEASE CONTACT: CTE@tea.texas.gov
https://tea.texas.gov/cte