- AGRIBUSINESS
- ANIMAL SCIENCE
- APPLIED AGRICULTURAL ENGINEERING
- ENVIRONMENTAL AND NATURAL RESOURCES
- FOOD SCIENCE AND TECHNOLOGY
- PLANT SCIENCE

Local Implementation Considerations:

Students completing two or more courses for two or more credits within a program of study earn concentrator status for Perkins V federal accountability reporting.

Proposed Indicator: Students finishing three or more courses for four or more credits with one course from level 3 or 4 within a program of study earn completer status for federal accountability reporting.

TEA
Texas Education Agency

COURSES

LEVEL 1

Principles of Agriculture, Food, and Natural Resources

LEVEL 2

Professional Standards in Agribusiness

LEVEL 3

Agribusiness Management and Marketing
Agricultural Leadership, Research, and Communications

LEVEL 4

Practicum in Agriculture, Food, and Natural Resources
Practicum in Entrepreneurship (TBD)
Career Preparation I

POSTSECONDARY OPTIONS

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
	Certified Professional Public Buyer	Agricultural Business and Management, General		
		Banking and Financial Support Services	Finance, General	
		Advertising	Financial Mathematics	
		Marketing/ Marketing Management, General		

Additional industry based certification information is available from the TEA CTE website.

For more information on postsecondary options for this program of study, visit TXCTE.org.

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Farmers, Ranchers, and Other Agricultural Managers	$59,134	405	9%
Farm and Ranch Loan Officers	$45,594	268	25%
Agricultural Advertising and Promotions Managers	$94,515	164	20%
Buyers and Purchasing Agents, Farm Products	$46,488	102	20%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Exploration Activities:
Tour a farm machinery products company
Texas FFA

Career Preparation:
Internship with a farm machinery products company;
work on a farm or ranch

The Agribusiness program of study explores the occupations and educational opportunities associated with the business of farming and agriculturally-related business that supplies farm inputs, such as machinery and seeds. This program of study may also include exploration into the marketing of farm products, the purchase of farm products either for further processing or resale, and grading or classifying unprocessed food or other agricultural products.

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.

Successful completion of the Agribusiness program of study will fulfill requirements of a Business and Industry Endorsement.

Program of Study Draft for Public Comment June 2019

TEA Texas Education Agency

COURSE INFORMATION

COURSE NAME	SERVICE ID	PREREQUISITES (PREQ) COREQUISITES (CREQ) RECOMMENDED PREREQUISITES (RPREQ) RECOMMENDED COREQUISITIES (CREQ)	GRADE
Principles of Agriculture, Food, and Natural Resources	13000200	None	9-12
Professional Standards in Agribusiness	13000800	None	10-12
Agribusiness Management and Marketing	13000900	None	10-12
Agricultural Leadership, Research, and Communications	N1300266	PREQ: One credit from courses in the Agriculture, Food, and Natural Resources Career Cluster	10-12
Practicum in Agriculture, Food, and Natural Resources	13002500 (2 credits) 13002505 (3 credits)	RPREQ: A minimum of one credit from the courses in the Agriculture, Food, and Natural Resources Career Cluster	9-12
Practicum in Entrepreneurship	TBD	TBD	TBD
Career Preparation I	12701300 (2 credits) 12701305 (3 credits)	None	11-12

FOR ADDITIONAL INFORMATION ON THE AGRICULTURE, FOOD, AND NATURAL RESOURCES CAREER CLUSTER, PLEASE CONTACT:

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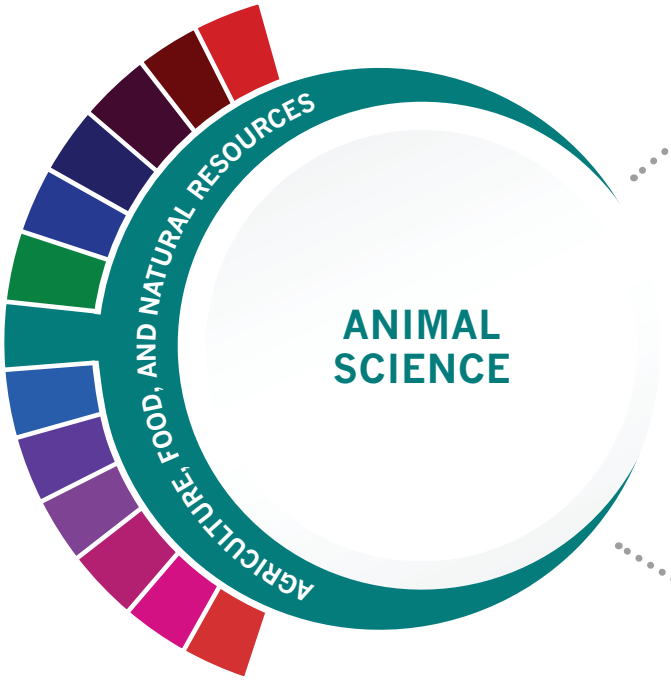

COURSES

LEVEL 1

Principles of Agriculture, Food, and Natural Resources

LEVEL 2

Small Animal Management
Equine Science

LEVEL 3

Livestock Production/Lab

LEVEL 4

Advanced Animal Science
Veterinary Medical Applications/Lab
Practicum in Agriculture, Food, and Natural Resources
Project-Based Research
Scientific Research and Design

POSTSECONDARY OPTIONS

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
Licensed Veterinary Technician	Pet Groomer	Food Science and Technology	Animal Sciences	Genetics
Feedyard Technician in Cattle Care and Handling	Veterinary Technician	Veterinary Studies	Agriculture	Veterinary Medicine
Certified Veterinary Assistant	Licensed Breeder	Biotechnology Laboratory Technician	Biology	Biological and Physical Sciences
		Biology Technician	Zoology/ Animal Biology	Biological and Biomedical Sciences

Additional industry based certification information is available from the TEA CTE website.

For more information on postsecondary options for this program of study, visit TXCTE.org.

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Animal Breeders	$39,135	28	9%
Animal Scientists	$57,533	22	12%
Medical Scientists	$63,898	435	27%
Veterinarians	$93,496	294	24%
Zoologists and Wildlife Biologists	$67,309	45	32%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Exploration Activities:
Texas FFA

Career Prep Activities:
Agri-Science Fair
4H
Volunteer at a local farm or veterinary office

The Animal Science program of study focuses on the science, research, and business of animals and other living organisms. It teaches students how to apply biology and life science to real-world life processes of animals and wildlife, either in laboratories or in the field, which could include a veterinary office, a farm or ranch, or any outdoor area harboring animal life. Students may also research and analyze the growth and destruction of species and research or diagnose diseases and injuries of animals.

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.

Successful completion of the Animal Science program of study will fulfill requirements of the Business and Industry Endorsement.

Program of Study Draft for Public Comment June 2019

TEA Texas Education Agency

COURSE INFORMATION

COURSE NAME	SERVICE ID	PRE REQS CO REQS REC REQS	GRADE
Principles of Agriculture, Food, and Natural Resources	13000200	None	9-12
Small Animal Management	13000400	None	10-12
Equine Science	13000500	None	10-12
Livestock Production/Lab	13000310 (1 credit) 13000310 (2 credits)	None	10-12
Advanced Animal Science	13000700	PREQ: Biology and Chemistry or Integrated Physics and Chemistry (IPC); Algebra I and Geometry; and either Small Animal Management, Equine Science, or Livestock Production; RPREQ: Veterinary Medical Applications	11-12
Veterinary Medical Applications/Lab	13000600 (1 credit) 13000610 (2 credits)	PREQ: Equine Science, Small Animal Management, or Livestock Production	11-12
Practicum in Agriculture, Food, and Natural Resources	13002500 (2 credits) 13002505 (3 credits)	RPREQ: A minimum of one credit from the courses in the Agriculture, Food, and Natural Resources Career Cluster	11-12
Project-Based Research	12701500	None	11-12
Scientific Research and Design	13037200	PREQ: Biology, Chemistry, Integrated Physics, and Chemistry (IPC), or Physics	11-12

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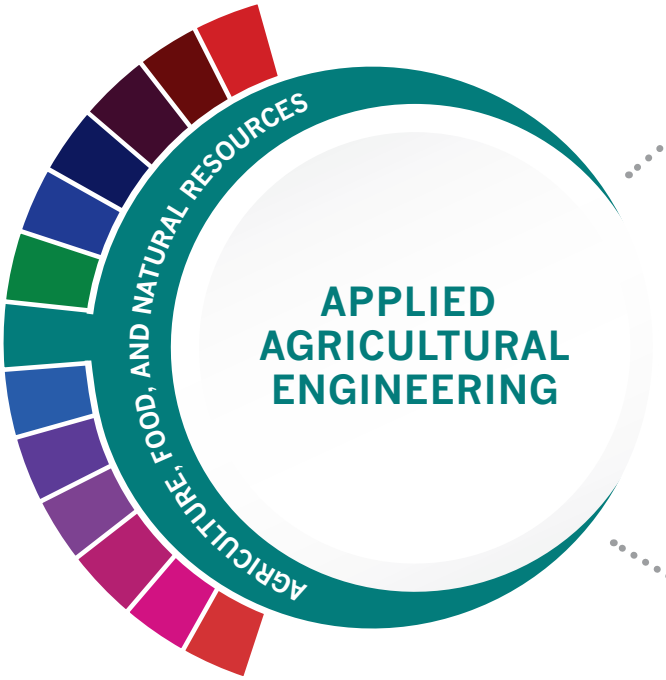

COURSES

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 (TBD)

LEVEL 4

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

POSTSECONDARY OPTIONS

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
OSHA 30 Hour General Industry	Certified Professional Agronomist	Heavy Equipment Maintenance Technology/ Technician	Agricultural Engineering	
Feedyard Technician in Machinery, Operation, Repair and Maintenance	Certified Reliability Engineer	Agricultural Mechanization, General	Agricultural Mechanization, General	
AWS SENSE Welding Level 1	Certified Irrigation Designer	Small Engine Mechanics and Repair Technology/ Technician		
AWS D1.1 Certification	Fluid Power Mobile Hydraulic Mechanic	Welding Technology/ Welder		

Additional industry based certification information is available from the TEA CTE website.

For more information on postsecondary options for this program of study, visit TXCTE.org.

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Outdoor Power Equipment and Other Small Engine Mechanics	$32,406	366	16%
Welders	$41,350	6,171	9%
Farm Equipment Mechanics and Service Technicians	$39,915	304	17%
Mobile Heavy Equipment Mechanics	$47,299	1,627	16%
Agricultural Engineers	$64,792	9	13%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Exploration Activities:
Tour a farm products or machinery plant
Texas FFA

Career Preparation:
Earn a welding certification; intern at a farm products or machinery plant

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.

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.

Successful completion of this program of study will fulfill requirements of a Business and Industry Endorsement.
Program of Study Draft for Public Comment June 2019

TEA Texas Education Agency

COURSE INFORMATION

COURSE NAME	SERVICE ID	PREREQUISITES (PREQ) COREQUISITES (CREQ) RECOMMENDED PREREQUISITES (RPREQ) RECOMMENDED COREQUISITIES (CREQ)	GRADE
Principles of Agriculture, Food, and Natural Resources	13000200	None	9-12
Agricultural Mechanics and Metal Technologies/Lab	13002200 (1 credit) 13002210 (2 credits)	None	10-12
Agricultural Structures Design and Fabrications/Lab	13002300 (1 credit) 13002310 (2 credits)	PREQ: Agricultural Mechanics and Metal Technologies	11-12
Agricultural Power Systems/Lab	13002400 (2 credits) 13002410 (3 credits)	RPREQ: Principles of Agriculture, Food, and Natural Resources	10-12
Geographic Information Systems for Agriculture	TBD	TBD	TBD
Agricultural Equipment Design and Fabrication/Lab	13002350 (1 credit) 13002360 (2 credits)	RPREQ: Agricultural Mechanics and Metal Technologies	11-12
Practicum in Agriculture, Food, and Natural Resources	13002500 (2 credits) 13002505 (3 credits)	RPREQ: A minimum of one credit from the courses in the Agriculture, Food, and Natural Resources Career Cluster	11-12
Project-Based Research	12701500	None	11-12
Scientific Research and Design	13037200	PREQ: Biology, Chemistry, Integrated Physics, and Chemistry (IPC), or Physics	11-12

FOR ADDITIONAL INFORMATION ON THE AGRICULTURE, FOOD, AND NATURAL RESOURCES CAREER CLUSTER, PLEASE CONTACT:

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COURSES

LEVEL 1

Principles of Agriculture, Food, and Natural Resources

LEVEL 2

Wildlife, Fisheries, and Ecology Management/Lab
Forestry and Woodland Ecology Systems/Lab

LEVEL 3

Range Ecology Management/Lab
Energy and Natural Resources Technology/Lab

LEVEL 4

Advanced Energy and Natural Resource/Lab
Practicum in Agriculture, Food, and Natural Resources
Project-Based Research
Scientific Research and Design

POSTSECONDARY OPTIONS

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
Wastewater Collections, Class 1	Board Certified Environmental Engineer - Hazardous Waste Management	Environmental Science		
Water Operators, Class D	Certified Water Technologist	Environmental Studies	Environmental/Environmental Health Engineering	
OSHA Hazardous Waste Operations and Emergency Response	Certified Environmental Scientist	Wildlife, Fish, and Woodlands Science and Management		
	Certified in Public Health	Environmental Engineering Technology/ Environmental Technology	Natural Resources Law Enforcement and Protective Services	Fishing and Fisheries Science and Management

Additional industry based certification information is available from the TEA CTE website.

For more information on postsecondary options for this program of study, visit TXCTE.org.

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Environmental Engineering Technicians	$53,352	101	32%
Environmental Engineers	$86,757	288	25%
Environmental Science and Protection Technicians, Including Health	$40,268	508	17%
Environmental Scientists and Specialists, Including Health	$77,896	644	24%
Zoologists and Wildlife Biologists	$67,309	45	32%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Exploration Activities:
Attend summer livestock judging camps
Texas FFA

Career Preparation:
Obtain a Wastewater Collections, Class 1 Certification;
intern at a waste treatment plant

The Environmental and Natural Resources program of study explores the occupations and educational opportunities associated with the research, design, and planning of engineering or technical duties in the prevention and control of environmental hazards. This program of study may also include exploration into conducting research for the purpose of identifying, abating, or eliminating sources of pollutants or hazards that affect either the environment or the health of the population.

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.

Successful completion of the Environmental and Natural Resources program of study will fulfill requirements of a Business and Industry Endorsement.

Program of Study Draft for Public Comment June 2019

Texas Education Agency

COURSE INFORMATION

COURSE NAME	SERVICE ID	PREREQUISITES (PREQ) COREQUISITES (CREQ) RECOMMENDED PREREQUISITES (RPREQ) RECOMMENDED COREQUISITIES (CREQ)	GRADE
Principles of Agriculture, Food, and Natural Resources	13000200	None	9-12
Wildlife, Fisheries, and Ecology Management/Lab	13001500 (1 credit) 13001510 (2 credits)	None	9-12
Forestry and Woodland Ecology Management/Lab	13001510 (1 credit) 13001710 (2 credits)	None	10-12
Range Ecology Management/Lab	13001600 (1 credit) 13001610 (2 credits)	None	10-12
Energy and Natural Resources Technology/Lab	13001100 (1 credit) 13001110 (2 credits)	RPREQ: Minimum one credit from the courses in Agriculture, Food, and Natural Resources Career Cluster	10-12
Advanced Energy and Natural Resources/Lab	13001200 (1 credit) 13001210 (2 credits)	RPREQ: A minimum of one credit from the courses in Agriculture, Food, and Natural Resource Career Cluster and Energy and Natural Resource Technology	11-12
Project-Based Research	12701500	None	11-12
Scientific Research and Design	13037200	PREQ: Biology, Chemistry, Integrated Physics, and Chemistry (IPC), or Physics	11-12

FOR ADDITIONAL INFORMATION ON THE AGRICULTURE, FOOD, AND NATURAL RESOURCES CAREER CLUSTER, PLEASE CONTACT:

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COURSES

LEVEL 1

Principles of Agriculture, Food, and Natural Resources

LEVEL 2

Food Technology and Safety/Lab

LEVEL 3

Food Processing/Lab

LEVEL 4

Practicum in Agriculture, Food, and Natural Resources
Project Based Research
Scientific Research and Design

POSTSECONDARY OPTIONS

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
	Certified Professional Agronomist	Food Science	Agricultural and Food Products Processing	Quality Control Technology/ Technician
	Certified Crop Advisor		Food Science and Nutrition	
	Certified Weighing Salespersons		Food Science and Technology	

Additional industry based certification information is available from the TEA CTE website.

For more information on postsecondary options for this program of study, visit TXCTE.org.

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Agricultural and Food Science Technicians	$34,382	236	11%
Supervisors of Production and Operating	$62,171	5,094	9%
Inspectors, Testers, Sorters, Samplers, and Weighers	$37,689	6653	9%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Exploration Activities:
Tour a food products processing facility
Texas FFA

Career Preparation:
Intern at a food products processing facility

The Food Science and Technology program of study explores the occupations and educational opportunities associated with working with agricultural and food scientists in food, fiber, and animal research, production, and processing. This program of study may also include assisting with animal breeding and nutrition, and conducting tests and experiments to improve yield and quality of crops or to increase the resistance of plants and animals to disease or insects.

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.

Successful completion of the Food Science and Technology program of study will fulfill requirements of a Business and Industry Endorsement.

Program of Study Draft for Public Comment June 2019

TEA Texas Education Agency

COURSE INFORMATION

COURSE NAME	SERVICE ID	PREREQUISITES (PREQ) COREQUISITES (CREQ) RECOMMENDED PREREQUISITES (RPREQ) RECOMMENDED COREQUISITIES (CREQ)	GRADE
Principles of Agriculture, Food, and Natural Resources	13000200	None	9-12
Food Technology and Safety/Lab	13001300 (1 credit) 13001310 (2 credits)	None	10-12
Food Processing/Lab	13001400 (1 credit) 13001410 (2 credits)	RPREQ: Food Technology and Safety	10-12
Practicum in Agriculture, Food, and Natural Resources	13002500 (2 credits) 13002505 (3 credits)	RPREQ: A minimum of one credit from the courses in the Agriculture, Food, and Natural Resources Career Cluster	11-12
Project-Based Research	12701500	None	11-12
Scientific Research and Design	13037200	PREQ: Biology, Chemistry, Integrated Physics, and Chemistry (IPC), or Physics	11-12

FOR ADDITIONAL INFORMATION ON THE AGRICULTURE, FOOD, AND NATURAL RESOURCES CAREER CLUSTER, PLEASE CONTACT:

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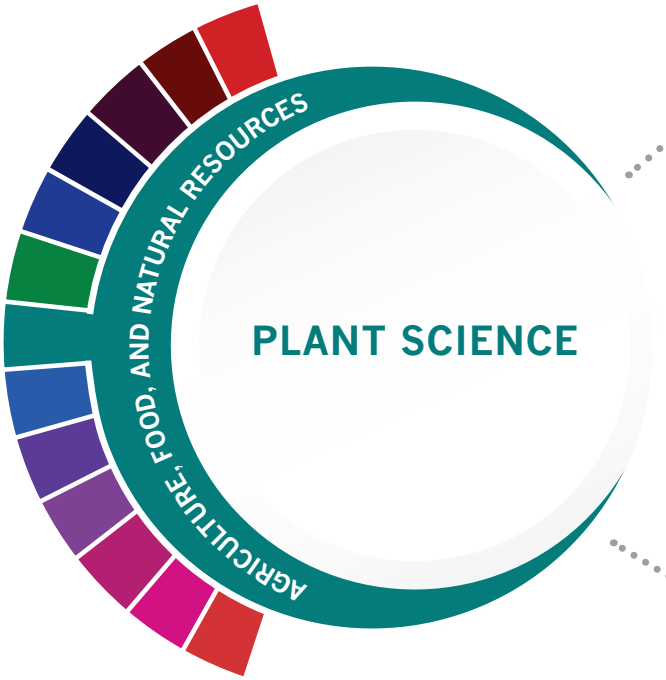

COURSES

LEVEL 1

Principles of Agriculture, Food, and Natural Resources

LEVEL 2

Landscape Design and Management
Greenhouse Operation and Production/Lab
Horticultural Science/Lab

LEVEL 3

Floral Design/Lab
Viticulture
Turf Grass Management

LEVEL 4

Advanced Floral Design
Advanced Plant and Soil Science
Practicum in Agriculture, Food, and Natural Resources
Project-Based Research
Scientific Research and Design

POSTSECONDARY OPTIONS

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
Landscape Irrigation Technician License	Pesticide Applicator	Applied Horticulture/ Horticulture Operations, General		
Commercial/ Noncommercial Pesticide Applicator	Certified Floral Designer	Ornamental Horticulture	Agronomy and Crop Science	
Texas State Floral Association Floral Skills Knowledge Based Certification	Accredited Member of AIFD	Agricultural Business and Management, General		
Texas State Floral Association Level One Floral Certification	Landscape Industry Certified Technician	Turf and Turfgrass Management		Farm/Farm and Ranch Management

Additional industry based certification information is available from the TEA CTE website.

For more information on postsecondary options for this program of study, visit TXCTE.org.

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Soil and Plant Scientists	$54,662	116	21%
Tree Trimmers and Pruners	$32,240	589	14%
Pesticide Handlers, Sprayers, and Applicators	$36,733	196	22%
Landscaping Supervisors	$44,408	807	19%
Biological Technicians	$42,931	452	17%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Exploration Activities:
Texas FFA

Career Prep Activities:
Work part-time at a florist;
start or work for a local landscaping business

The Plant Science program of study focuses on the science, research, and business of plants and other living organisms. It teaches students how to apply biology and life science to real-world life processes of plants and vegetation, either in laboratories or in the field.

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.

Successful completion of the Plant Science program of study will fulfill requirements of a Business and Industry Endorsement.

Program of Study Draft for Public Comment June 2019

Texas Education Agency

COURSE INFORMATION

COURSE NAME	SERVICE ID	PREREQUISITES (PREQ) COREQUISITES (CREQ) RECOMMENDED PREREQUISITES (RPREQ) RECOMMENDED COREQUISITIES (CREQ)	GRADE
Principles of Agriculture, Food, and Natural Resources	13000200	None	9-12
Floral Design/Lab	13001800 (1 credit) 13001810 (2 credits)	None	9-12
Landscape Design and Management	13001900	None	10-12
Turf Grass Management	13001950	None	10-12
Horticultural Science/Lab	13002000 (1 credit) 13002010 (2 credits)	13002000 13002010	10-12
Advanced Floral Design	N1300270	PREQ: Floral Design	11-12
Greenhouse Operation and Production/Lab	13002050 (1 credit) 13002060 (2 credits)	None	10-12
Viticulture	N1300265	RPREQ: Principles of Agriculture, Food, and Natural Resources	10-12
Advanced Plant and Soil Science	13002100	RPREQ: Biology, Integrated Physics and Chemistry (IPC), Chemistry, or Physics and a minimum of one credit from courses in the AFNR cluster	11-12
Practicum in Agriculture, Food, and Natural Resources	13002500 (2 credits) 13002505 (3 credits)	RPREQ: minimum of one course from the AFNR cluster	11-12
Project-Based Research	12701500	None	11-12
Scientific Research and Design	13037200	PREQ: Biology, Chemistry, Integrated Physics and Chemistry (IPC), or Physics	11-12

FOR ADDITIONAL INFORMATION ON THE AGRICULTURE, FOOD, AND NATURAL RESOURCES CAREER CLUSTER, PLEASE CONTACT:

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