CAREER PROGRAMS IN AGRICULTURE, FOOD, AND NATURAL RESOURCES

CAREER CLUSTER	Agriculture, Food and Natural Resources	Agriculture, Food and Natural Resources	Agriculture, Food and Natural Resources	Agriculture, Food and Natural Resources	Agriculture, Food and Natural Resources	Agriculture, Food and Natural Resources	Agriculture, Food and Natural Resources	Agriculture, Food and Natural Resources
CIP	**01.0101**	**01.0901**	**01.0000**	**15.0507**	**01.0401**	**03.0101**	**01.0601**	**01.0201**
PROGRAM TITLE	**Agribusiness Systems**	**Animal Systems**	**Biotechnology Systems**	**Environmental Service Systems**	**Food Products and Processing Systems**	**Natural Resource Systems**	**Plant Systems**	**Power, Structural and Technical Systems**
	GROUP 1: ORIENTATION COURSES (Minimum Selection: One course from Group 1 or 2)							
ORIENTATION COURSES	Career Exploration	Career Exploration	Career Exploration	Career Exploration	Career Exploration	Career Exploration	Career Exploration	Career Exploration
	Exploratory Agricultural Science	Exploratory Agricultural Science	Exploratory Agricultural Science	Exploratory Agricultural Science	Exploratory Agricultural Science	Exploratory Agricultural Science	Exploratory Agricultural Science	Exploratory Agricultural Science
	GROUP 2: INTRODUCTORY COURSES							
INTRODUCTORY COURSES	Basic Agricultural Science	Basic Agricultural Science	Basic Agricultural Science	Basic Agricultural Science	Basic Agricultural Science	Basic Agricultural Science	Basic Agricultural Science	Basic Agricultural Science
	Introduction to the Agricultural Industry	Introduction to the Agricultural Industry	Introduction to the Agricultural Industry	Introduction to the Agricultural Industry	Introduction to the Agricultural Industry	Introduction to the Agricultural Industry	Introduction to the Agricultural Industry	Introduction to the Agricultural Industry
		Basic Animal Science		Physical Science Applications in Agriculture I	Basic Agricultural Processing	Basic Natural Resource Management	Basic Horticultural Science	Basic Agricultural Mechanics
		Biological Science Applications in Agriculture - Animals					Biological Science Applications in Agriculture - Plants	Physical Science Applications in Agriculture I
	GROUP 3: SKILLS COURSE (Minimum Selection: One course from Group 3)							
SKILLS COURSE	Agricultural Business Management	Animal Science	Agricultural Biotechnology	Environmental Science	Food Science Technology	Natural Resources Conservation Management	Horticultural Production & Management	Agricultural Mechanics & Technology
	Agricultural Sales and Marketing	Veterinary Technology		Water Treatment	Animal Processing	Wildlife Management	Landscaping & Turf Management	Agricultural Construction and Technology
		Companion and Service & Support Animal Training			Plant Processing	Hunter Education	Greenhouse Production	Agriculture Welding
						Urban Forestry	Agronomy	Agricultural Metal Fabrication
						Forestry	Urban Agriculture	
	GROUP 4: ADVANCED COURSES (Optional)							
ADVANCED COURSES	Agribusiness Independent Study	Animal Systems Independent Study	Agricultural Biotechnology Independent Study	Environmental Service Systems Independent Study	Agricultural Production and Processing Independent Study	Natural Resources Independent Study	Plant Systems Independent Study	Agricultural Mechanics and Construction Independent Study
	Agriculture Computers and Technology	Agriculture Computers and Technology	Agriculture Computers and Technology	Agriculture Computers and Technology	Agriculture Computers and Technology	Agriculture Computers and Technology	Agriculture Computers and Technology	Agriculture Computers and Technology
	Agricultural Leadership	Agricultural Leadership	Agricultural Leadership	Agricultural Leadership	Agricultural Leadership	Agricultural Leadership	Agricultural Leadership	Agricultural Leadership
	Agricultural Communications	Advanced Biological Science Applications in Agriculture	Sustainable Agriculture	Soil Science	Sustainable Agriculture	Soil Science	Soil Science	Geospatial Technology
	Marketing Commodities	Animal Nutrition	Integrated Pest Management	Alternative Energy	Aquacultural Science and Technology	Alternative Energy	Sustainable Agriculture	Agricultural Machinery Service
		Animal Genetics	Soil Science	Biotechnical Engineering		Technology, Society and Sustainability	Viticulture	Biotechnical Engineering

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		Small Animal Care	Biotechnical Engineering	Sustainable Agriculture		Geospatial Technology	Advanced Biological Science Applications in Agriculture	Precision Agriculture
		Large Animal Care		Physical Science Applications in Agriculture II		Aquacultural Science and Technology	Aquacultural Science and Technology	Physical Science Applications in Agriculture II
		Equine Science		Technology, Society and Sustainability			Floral Design	
		Aquacultural Science and Technology		Geospatial Technology				
				Precision Agriculture				
	GROUP 5: WORKPLACE EXPERIENCE COURSES							
WORKPLACE EXPERIENCE	Agribusiness Workplace Experience	Animal Systems Workplace Experience	Agricultural Biotechnology Systems Workplace Experience	Environmental Service Systems Workplace Experience	Agricultural Production and Processing Workplace Experience	Natural Resources Workplace Experience	Plant Systems Workplace Experience	Power, Structural and Technical Systems Workplace Experience

A quality CTE program delivers all required elements of Illinois' definition of Size, Scope, Quality. CTE program elements include: a sequence of courses, each educational entity offering approved courses provides assurance that the course content includes at a minimum the State course description, meets the State's minimum requirements for course offerings by program, curriculum aligned to state recognized learning standards & industry standards, career pathway guidance, resources to support program/course delivery (licensed & qualified staff, appropriate facilities, adequate equipment, instructional materials, work-based learning experiences, special populations support services, an active affiliated CTSO chapter), articulation/dual credit agreements, documentation of state agency certification or licensing requirements for occupations regulated by law or licensure, and content which prepare students for reflective of current labor & opportunity for workplace experience or a structured capstone course. ***Orientation courses are suggested to be taught at the prior-to-secondary or 9th grade levels. Introductory level courses are suggested to be taught at the 9th-11th grade level. Skill level courses are suggested to be taught at the 10th – 12th grade levels. Workplace Experiences Courses are suggested to be taught at the 12th grade level.***

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Group	State Course Code	State Course Title	State Course Description
Group 1	22151A001	Career Exploration	Career Exploration courses help students identify and evaluate personal goals, priorities, aptitudes, and interests with the goal of helping them make informed decisions about their careers. These courses expose students to various sources of information on career and training options and may also assist them in developing job search and employability skills.
Group 1	68003A001	Exploratory Agricultural Science	This exploration course provides the opportunity to learn fundamental concepts in agriculture to serve as a foundation for future courses and to inform students about the industry that is so vital to society and to their future. Major units of instruction include an introduction to the agricultural industry, animal science, plant science, horticulture science, agribusiness, environmental science, agricultural mechanics, food science, and leadership and personal development. Participation in FFA student organization activities is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 2	18003A001	Basic Agricultural Science	This course builds on basic skills and knowledge gained in the Introduction to the Agricultural Industry course. Major units of instruction include agricultural research, soil science, advanced plant science, biotechnology, advanced animal science. Applied science and math skills and concepts will be stressed throughout the course as they relate to each area. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 2	18001A001	Introduction to the Agricultural Industry	This course provides an opportunity for students to learn how the agricultural industry is organized; its major components; the economic influence of agriculture at state, national and international levels; and the scope and types of job opportunities in the agricultural field. Basic concepts in animal science, plant science, soil science, horticulture, natural resources, agribusiness management, and agricultural mechanics, will be presented. Improving computer and workplace skills will be a focus . Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 2	18101A003	Basic Animal Science	This course is designed to introduce students to the livestock (beef, dairy, sheep, goats, and swine), poultry, and large (equine) animal industry and provide them with basic animal science knowledge that can be further developed in advanced animal science courses. Major units of instruction include animal science careers, animal anatomy and physiology, animal reproduction, animal nutrition, genetics, animal health, small and large animal care, and meat science. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 2	18101A001	Biological Science Applications in Agriculture - Animals	This course is designed to reinforce and extend students understanding of science by associating scientific principles and concepts with relevant applications in agriculture. Students will examine major phases of animal agriculture and specific biological science concepts that govern management decisions in the animal industry. Topics of study are in the areas of growth and development of animals – embryology, ethology, nutrition, immunity systems, and processing animal products –

			preservation, fermentation, and pasteurization. The course will be valuable preparation for further education and will increase the relevance of science through the applied setting of agriculture by enhancing literacy in science and the scientific process. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 2	18504A003	Basic Natural Resource Management	This course is designed to introduce students to management and conservation skills and provide them with basic natural resource management knowledge that can be further developed in more advanced courses. Units include introduction to: understanding natural resources and its importance; fish, wildlife, and forestry management and conservation; and exploring outdoor recreational enterprises. Career exploration will be discussed including: park ranger, game warden, campground manager, forester, conservation officer, wildlife manager, and related occupations. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 2	18052A001	Basic Horticultural Science	This course is designed to introduce students to the horticulture industry and provide them with basic plant science knowledge that can be further developed in advanced horticulture courses. Major units of instruction include horticulture research, horticultural careers, plant anatomy, seed germination, plant propagation, growing media, pest management, hydroponics, identifying horticultural plants, growing greenhouse crops, and floral design. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 2	18302A001	Basic Agricultural Processing	Basic Agricultural Processing courses provide students with the basic knowledge and skills needed to bring animal and plant products to market that can be further developed in advanced agricultural processing courses. They may cover a wide variety of topics, including care and maintenance of animals or plants, quality selection and preservation, equipment care and sanitation, government regulations, and marketing and consumer trends.
Group 2	18051A002	Biological Science Applications in Agriculture - Plants	This course is designed to reinforce and extend students understanding of science by associating basic scientific principles and concepts with relevant applications in agriculture. Students will examine major phases of plant growth and management in agriculture and the specific biological science concepts that govern management decisions. Topics of study are in the areas of initiating plant growth – germination, plant sensory mechanisms, enzyme action, absorption, and managing plant growth – photosynthesis, respiration, translocation, metabolism, and growth regulation. The course will be valuable preparation for further education and will increase the relevance of science through the applied setting of agriculture by enhancing literacy in science and the scientific process. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 2	18401A001	Basic Agricultural Mechanics	In this course, theory and hands-on experiences provide opportunities for students to develop basic knowledge and skills in agricultural mechanics. Instructional areas include the basic fundamentals of

			maintaining and repairing small gasoline engines, basic electricity, welding, construction, cold metal work, and operating agricultural equipment safely. Improving workplace and computer skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 2	18449A002	Physical Science Applications in Agriculture I	This course is designed to reinforce and extend students understanding of physical science and the scientific process by associating scientific and math principles and concepts with relevant applications in agriculture. Topics of study are in the areas of scientific investigations, environmental/natural resource systems, agricultural production systems, agricultural structural systems, energy and power systems, agricultural mechanics and machine systems, and food processing systems. The course will be valuable preparation for further education and will increase the relevance of science through the applied setting of agriculture by enhancing literacy in science and the scientific process. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18201A001	Agricultural Business Management	This course will provide students with the basic knowledge and skills necessary to manage personal finances and develop into a successful entrepreneur and/or businessperson. Instructional units include; business ownership types, starting an agribusiness, managing and operating an agribusiness, financing an agribusiness, managing personal finances, record keeping and financial management of an agribusiness, local, state, and federal taxes, agricultural law, and developing employability skills. Student skills will be enhanced in math, reading comprehension, and writing through agribusiness applications. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration, and reinforcement of academic concepts.
Group 3	18202A001	Agricultural Sales and Marketing	This course is designed to develop student knowledge and skills in agricultural sales and marketing, commodity marketing, agricultural economics, and international agriculture. Instructional units include: successfully starting an agribusiness, developing a marketing plan, pricing, advertising, and selling products and services, communicating with customers, applying commodity trading techniques, basic economic principles, the international agribusiness economy, and agricultural career opportunities. Student skills will be enhanced in math, reading comprehension, communications, and writing through agribusiness applications. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18101A002	Animal Science	This course will develop students' understanding of the livestock (beef, dairy, sheep, goats, and swine), poultry, and large (equine) animal industry. Topics of instruction include scientific investigations, genetics, animal anatomy and physiology, animal nutrition, animal reproduction, animal health, and meat science. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE)

			projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18105A001	Veterinary Technology	This course will develop students' understanding of the small and companion animal industry, animal anatomy and physiology, animal ethics and welfare issues, animal health, veterinary medicine, veterinary office practices, and animal services to humans . Career exploration will focus on veterinarian, veterinary lab technicians, office lab assistant, small animal production, research lab assistant, and animal nutrition lab technician. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18106A001	Companion and Service & Support Animal Training	Companion and Service Animal Training courses provide students with skills and knowledge necessary to provide care and training for companion and service animals. Topics include animal behavior, training tools, and animal care. The course will focus on providing students understanding on how to select, socialize, and train companion and service animals to do work or perform tasks for the benefit of an individual with a disability, including a physical, sensory, psychiatric, intellectual, or other mental disability.
Group 3	18308A001	Agricultural Biotechnology	This course examines the agricultural applications of biotechnology, the use of living organisms to solve problems or make useful products. Applications include technologies used in bioprocessing, cell /tissue culture, genetic and protein engineering. Specific units of instruction include: impacts of biotechnology, genetics, and biotechnology in plant, animal, and microbial science. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts
Group 3	18504A001	Environmental Science	This course examines the relationship of agriculture and the environment. The impact of plant and animal production practices on the environment and the adoption of practices leading to improved air, land, and water quality are investigated. Areas of emphasis include: types of ecosystems, management of waste, chemical use, soil conservation, land uses and regulations, and water and air quality. Encouraging students to be conscious and concerned about the environment and recognizing the need to conserve the environment and its resources will be a theme throughout. Careers of environmental technicians, soil and water conservationists, monitoring field technicians, land surveyor, and related occupations will be examined. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18406A001	Water Treatment	Water Treatment courses provide instruction regarding the environmental hazards associated with identifying and accepting waste water disposal. Course topics typically include waste water, the steps in waste water treatment, compliance with applicable regulations, and the use of water-testing instruments and water-treatment equipment to treat wastewater.
Group 3	18305A001	Food Science Technology	This course provides learning experiences in food science and safety which allow students to apply scientific knowledge and processes to practices used in the development and preservation of food products. Issues of food science and safety are examined from a scientific and technological

			perspective. Students critically analyze information to evaluate and draw conclusions on the appropriate use of technology to implement food science and safety practices. Units of instruction include : principles of food preservation, food processing, biochemistry of foods, and food selection and consumer health. Careers to be examined include meat inspector, quality control technician, food processor, and sanitation supervisor. Students will use scientific and technological information about food science and safety as a part of developing career plans and personal viewpoints on societal issues concerning the development and preservation of food products. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18303A001	Plant Processing	Plant Processing courses impart the knowledge and skills needed to bring plant products to market. They may cover a wide variety of topics, including plant production, quality selection and preservation, equipment care and sanitation, government regulations, and marketing and consumer trends. Plant Processing courses may present an overview of product processing or may specialize in specific plant products.
Group 3	18304A001	Animal Processing	Animal Processing courses impart the knowledge and skills needed to bring animal products to market. Although these courses may present an overview of animal care and maintenance, they typically emphasize quality selection, product preservation, equipment care and sanitation, government regulations, and marketing and consumer trends. Animal Processing courses may present an overview of several types of animal products or may specialize in particular products, such as meat, leather, wool, dairy products, and so on.
Group 3	18504A002	Natural Resources Conservation Management	This course develops management and conservation skills in understanding the connection between agriculture and natural resources. Student knowledge and skills are developed in: understanding natural resources and its importance; fish, wildlife, and forestry management and conservation; and exploring outdoor recreational enterprises. Hunting and fishing as a sport, growing and managing tree forests, and outdoor safety education will be featured. Career exploration will be discussed including: park ranger, game warden, campground manager, forester, conservation officer, wildlife manager, and related occupations. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18501A001	Wildlife Management	Often with an emphasis on the conservation of natural resources and frequently including outdoor recreation topics, Wildlife Management courses provide students with the opportunity to understand and appreciate the importance of maintaining the land and ecological systems that enable nondomesticated animals to thrive. Wildlife Management courses emphasize how humans and animals may both take advantage of the same land or how to gain economic benefits from the land while not degrading its natural resources or depleting plant or animal populations.
Group 3	18505A001	Hunter Education	Hunter education courses provide students with the basic skills and knowledge of hunter safety and responsibility. Topics typically include hunter responsibility and ethics; treestand safety; firearms and ammunition; field safety; first aid; bowhunting; muzzleloading; wildlife conservation and identification; and Illinois state regulations

Group 3	18502A001	Forestry	Forestry courses provide students with the information and experience necessary for the cultivation, management, and care of forests or timberlands. Forestry courses cover topics such as the processes of regeneration and reforestation, harvesting and conservation of natural resources, erosion and pest control, trail development and maintenance, mapping and surveying, operation of forestry tools, government regulations, environmental stewardship, and recreational use of forests.
Group 3	18505A002	Urban Forestry	Urban Forestry courses provide introduction to principles and practices useful in the management of trees and forests in urban settings. Topics typically include the benefits of trees and forestry; duties and responsibilities of municipal foresters; street tree management planning; and management strategies consistent with the biological, physical, economic and social constraints of the urban environment.
Group 3	18051A001	Horticultural Production & Management	This course offers instruction in both the greenhouse production and landscape areas of horticulture. Units of study include plant identification, greenhouse management, growing greenhouse crops, landscape design, installation, and maintenance, horticulture mechanics, nursery management, and turf production. Agribusiness units will cover operating a horticultural business, pricing work, advertising, and sales. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18054A001	Landscaping & Turf Management	This advanced course focuses on the landscape, nursery, and turf segments of the horticulture industry. Units of student instruction include: identifying landscape plants, designing landscape plans, hardscape construction techniques, and installing landscape plants. Also included are nursery production, turfgrass production, small engine repair, and maintenance of existing landscapes. Agribusiness units will cover calculating prices for work, managing a horticulture business, advertising, and sales. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18053A001	Greenhouse Production	This course focuses on the greenhouse management, floral design and related segments of the horticulture industry. Major units of study include floriculture plant identification, greenhouse structures, and the culture of greenhouse crops. Also included are care and handling of cut flowers, principles of art applied to floral design, and the mechanics of floral design. Agribusiness units will be introduced in merchandising, advertising, sales, and operating a retail floral business. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18051A003	Agronomy	This course is designed to provide students with the knowledge and skills necessary for future employment in the agronomy or related industries. Major units of instruction include scientific method, cellular biology, genetics, biotechnology, soil classifications, soil erosion and management, soil fertility, plant classification, plant anatomy and physiology, plant propagation, plant growth, integrated pest management, grain, oil, forage, sugar, and fiber crop production methods, grain quality, grain storage, and grain transportation. Applied science and math skills and concepts will be

			stressed throughout the course as they relate to each area. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18309A001	Urban Agriculture	Urban Agriculture courses explore the principles and practices of urban agricultural production. Topics typically include urban crop production, harvesting, and management strategies. Other topics may include ethical, social, and environmental impacts of food and urban farming, and urban agriculture as a social movement.
Group 3	18402A001	Agricultural Mechanics & Technology	This course will concentrate on expanding student's knowledge and experiences with agricultural mechanics technologies utilized in the agricultural industry. Units of instruction included are: design, construction, fabrication, maintenance, welding, electricity/electronics, internal combustion engines, hydraulics, and employability skills. Careers of agricultural construction engineer, electrician, plumber, welder, equipment designer, parts manager, safety inspector, welder, and other related occupations will be examined. Improving workplace and computer skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18403A001	Agricultural Construction and Technology	This advanced course focuses on the knowledge, hands-on skills, and work place skills applicable to construction in the agricultural industry. Major units of instruction include: personal safety, hand tools, power tools, blue print reading, surveying, construction skills in carpentry, plumbing, electricity, concrete, block laying, drywall and painting. Careers such as agricultural engineers, carpenter, plumber, electrician, concrete and block layers, finishers, safety specialists, and other related occupations will be examined. Improving workplace and computer skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18404A001	Agriculture Welding	Agriculture Welding focuses on the development of advanced welding and metal fabrication techniques utilized within the agricultural industry. Topics of instruction may include welding safety, technical drawings & blueprint reading, equipment setup, metal preparation, cutting processes, oxy-fuel cutting/welding, shielded metal arc welding, gas metal arc welding, flux cored arc welding, and gas tungsten arc welding processes. This course should be aligned with an industry-recognized credential. Upon successful completion, it is suggested students receive an industry certification or dual-credit through a local accredited institution. Improving workplace skills will be a focus in this course. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 3	18401A002	Agricultural Metal Fabrication	This course will emphasize the development of basic welding and metalworking skills necessary to succeed in agricultural careers in the agricultural metal fabrication industry. Topics of instruction include: metal identification and properties, metal preparation, use of oxy-acetylene torch, plasma cutting and cutting operations, arc welding, MIG welding, TIG welding, and project design and construction. Improving workplace and computer skills will be a focus. Participation in FFA student

			organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 4	18247A001	Agribusiness Independent Study	Courses in Agribusiness Independent Study, often conducted with instructors as mentors, enable students to explore topics of interest related to agribusiness. Independent Study courses may serve as an opportunity for students to expand their expertise in a particular application, to explore a topic in greater detail, or to develop more advanced skills.
Group 4	18205A001	Agriculture Computers and Technology	Agriculture Computers and Technology courses help students develop their knowledge and skills in using computer and other technology to operate and manage agricultural businesses. These courses allow students to use computer hardware, software, and the Internet to find information, record and analyze financial and production data, track market trends and economic forecasts, monitor weather, utilize global positioning systems, and prepare communications and reports.
Group 4	18203A003	Agricultural Leadership	Agricultural Leadership courses help students develop leadership skills with a focus on opportunities in the food, fiber, and natural resources industries. Topics may include but are not limited to human relationships and effective communication, decision-making and problem-solving, leadership qualities and styles, and ensuring successful completion of group activities. Students will learn to lead groups and teams, manage volunteers, exercise leadership ethics, and be able to demonstrate leadership in multicultural settings.
Group 4	18203A002	Agricultural Communications	Students will analyze current agricultural issues and determine how they affect people on all sides of the issue. The students then learn and enhance their written and oral communication skills by presenting their views and opinions to the class. Students learn how to arrange and present debates, speeches, and interviews to be effective leaders in today ’s society. This course can also be designed to provide students with the knowledge and leadership experiences to help them to become successful in life and in the workplace. Students will further enhance their potential for leadership development, personal growth, and career success. Topics may include workplace skills, effective communication, decision -making, problem-solving, leadership styles and qualities, and successful execution of teamwork or collaborative activities. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 4	12168A001	Marketing Commodities	Marketing Commodities courses investigate the meaning and methods of marketing as related to agricultural commodities, products and services, and agricultural goods in domestic and international markets. Topics typically include appropriate market research; benefit/cost analysis of marketing; and methods of targeted agricultural marketing in domestic and international markets.
Group 4	18147A001	Animal Systems Independent Study	Courses in Animal Systems Independent Study, often conducted with instructors as mentors, enable students to explore topics of interest related to animal systems. Independent Study courses may serve as an opportunity for students to expand their expertise in a particular application, to explore a topic in greater detail, or to develop more advanced skills.
Group 4	03064A001	Advanced Biological Science Applications in Agriculture	Advanced Biological Science Applications in Agriculture courses are designed to provide information regarding the fundamental concepts of life and life processes as related to the local environment. Course topics may include nature appreciation, local flora and fauna, biology, and zoology. The course will be valuable preparation for further education and will increase the relevance of science through the applied setting of agriculture by enhancing literacy in science and the scientific process.

			Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 4	18107A001	Animal Nutrition	Animal Nutrition courses provide students with opportunities to study the structure and function of organic and inorganic nutrients. Topics may include the essential nutritive requirements of domestic livestock, poultry, and companion animals; digestion, absorption, metabolism, and barriers for nutrient utilization; sources of nutrients; application of energy systems and concepts; and regulation of feed intake in animals. These courses also teach students how to compare and contrast the nutritional levels for animal maintenance and production.
Group 4	18108A001	Animal Genetics	Animal Genetics courses explore genetic inheritance in agricultural animals and the identification of livestock breeds by the origin, significance, distribution, and domestication of animal species. These courses allow students to compare and contrast the hierarchical classification of the major agricultural animal species and identify breeding system options based on the principles of genetics. These courses also address selecting animals based on quantitative breeding values for specific characteristics.
Group 4	18102A001	Small Animal Care	Small Animal Care courses focus on the care and management of small animals. Animal nutrition, health, behavior, reproduction and breeding, anatomy and physiology, use of qualitative and quantitative analyses for decisionmaking, facilities, handling and training, and grooming are typical areas of study.
Group 4	18103A001	Large Animal Care	Large Animal Care courses focus on the care and management of large animals. Animal nutrition, health, behavior, reproduction and breeding, anatomy and physiology, use of qualitative and quantitative analyses for decisionmaking, facilities, handling and training, and grooming are typical areas of study. Course topics may include product processing and marketing.
Group 4	18104A001	Equine Science	Equine Science courses focus on the care and management of horses. Animal nutrition, health, behavior, reproduction and breeding, anatomy and physiology, use of qualitative and quantitative analyses for decisionmaking, facilities, handling and training, and grooming are typical areas of study.
Group 4	18306A001	Aquacultural Science and Technology	This course is designed to develop student knowledge and skills in the area of aquacultural science and technology . Instructional units include basic studies of aquacultural species; reproduction processes, genetics, nutrition and health in aquacrops; ecological balances; and environmental requirements of aquatic plants and animals. Water quality, chemical and temperature analyses will be conducted for a variety of aquacrops. Individual and group experimentation and student research project(s) are required for satisfactory completion of this course. Careers to be examined include fish hatchery technician, production manager, fish nutritionist, and researcher. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 4	18997A001	Agricultural Biotechnology Independent Study	Courses in Agricultural Biotechnology Independent Study, often conducted with instructors as mentors, enable students to explore topic of interest related to agriculture, food, and natural resources. Independent Study courses may serve as an opportunity for students to expand their expertise in a particular application, to explore a topic in greater detail, or to develop more advanced skills.

Group 4	18310A001	Sustainable Agriculture	Sustainable/Alternative Agriculture courses explore technological and environmental changes and concerns. These courses address alternative approaches to food production including, but not limited to, organics, low-input, natural, and sustainable production methodology and practices. Course content may include comparing the effects of alternative production practices to those of conventional production practices.
Group 4	18109A001	Integrated Pest Management	Integrated Pest Management courses help students develop an understanding of the life cycles of and damage caused by pests, diseases, and weeds. Course topics may include the application of pesticides and/or herbicides to manage pest populations and assessing the effectiveness of pest management plans.
Group 4	18055A001	Soil Science	Soil Science courses involve the study of soil properties, including soil chemistry, biology, fertility, mineralogy, and hydrology. Topics covered may also include soil conservation, irrigation, soil genesis, soil surveys, and management.
Group 4	21014A001	Biotechnical Engineering	Biotechnical Engineering courses enable students to develop and expand their knowledge and skills in biology, physics, technology, and mathematics. Course content may vary widely, drawing upon diverse fields such as biomedical engineering, biomolecular genetics, bioprocess engineering, agricultural biology, or environmental engineering. Students may engage in problems related to biomechanics, cardiovascular engineering, genetic engineering, agricultural biotechnology, tissue engineering, biomedical devices, human interfaces, bioprocesses, forensics, and bioethics.
Group 4	18997A002	Environmental Service Systems Independent Study	Courses in Environmental Service Systems Independent Study, often conducted with instructors as mentors, enable students to explore topic of interest related to agriculture, food, and natural resources. Independent Study courses may serve as an opportunity for students to expand their expertise in a particular application, to explore a topic in greater detail, or to develop more advanced skills.
Group 4	18506A001	Alternative Energy	Alternative Energy courses help students identify renewable and nonrenewable energy sources and natural resources. Topics typically include alternative energy sources and their respective advantages and disadvantages; the impact of conventional and alternative energy sources on the environment; the efficiency of energy production from various sources; and careers in the fields of alternative energy and sustainability.
Group 4	18449A003	Physical Science Applications in Agriculture II	This course is designed to reinforce and extend students understanding of physical science and the scientific process by associating scientific and math principles and concepts with relevant applications in agriculture. Topics of study are in the areas of scientific investigations, environmental/natural resource systems, agricultural production systems, agricultural structural systems, energy and power systems, agricultural mechanics and machine systems, and food processing systems. The course will be valuable preparation for further education and will increase the relevance of science through the applied setting of agriculture by enhancing literacy in science and the scientific process. Improving computer and workplace skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 4	21054A004	Technology, Society and Sustainability	Technology, Society and Sustainability course will provide an overview of the importance of, impact on, and relationships between technological endeavors and society at large. This courses typically

			emphasize environmental factors, economics impacts and the influences of society on technological/environmental endeavors.
Group 4	21058A001	Geospatial Technology	Geospatial Technology courses provide students with experiences pertaining to the study of geographic information systems (GIS), global positioning systems (GPS), remote sensing (RS), digital image processing simulator (DIPS), Geodesy, automated cartography (Auto-Carto), land surveying (LS), and navigation. These courses may use spatial analysis models and guidelines for integrating, interpreting, analyzing, and synthesizing geographic data, with a focus on both the implications and limitations of such technologies. Other topics may include interfacing with telecommunications and automated database management systems.
Group 4	18405A001	Precision Agriculture	Precision Agriculture courses provide a fundamental understanding of the principles of precision agriculture. Topics may include Global Positioning Systems (GPS); Geographical Information Systems (GIS); yield monitors; remote sensing; drones; grid soil sampling; variable rate application; and guidance to effectively use data to make informed production management decisions.
Group 4	18347A001	Agricultural Production and Processing Independent Study	Courses in Agricultural Production and Processing Independent Study, often conducted with instructors as mentors, enable students to explore topics of interest related to agricultural production and processing. Independent Study courses may serve as an opportunity for students to expand their expertise in a particular application, to explore a topic in greater detail, or to develop more advanced skills.
Group 4	18547A001	Natural Resources Independent Study	Courses in Natural Resources Independent Study, often conducted with instructors as mentors, enable students to explore topics of interest related to natural resources. Independent Study courses may serve as an opportunity for students to expand their expertise in a particular application, to explore a topic in greater detail, or to develop more advanced skills.
Group 4	18097A001	Plant Systems Independent Study	Courses in Plant Systems Independent Study, often conducted with instructors as mentors, enable students to explore topics of interest related to plant systems. Independent Study courses may serve as an opportunity for students to expand their expertise in a particular application, to explore a topic in greater detail, or to develop more advanced skills.
Group 4	18311A001	Viticulture	Viticulture courses prepare students for further studies in grape-growing, viticulture, and wine-making industry. Course topics typically include establishing and managing vineyards; harvesting; fermentation and wine making; marketing; and exploring career options within the industry. Agricultural applications specific to vineyards and wineries are emphasized.
Group 4	18056A001	Floral Design	Floral Design courses introduce students to the foundations and the technical methods of flower arranging as well as composition, color, and design. Topics include the study of basic design principles, flower choice, professional tools, and decorative uses and arrangements of flowers, foliages, and accessories.
Group 4	18447A001	Agricultural Mechanics and Construction Independent Study	Courses in Agricultural Mechanics and Construction Independent Study, often conducted with instructors as mentors, enable students to topics of interest related to agricultural mechanics and/or construction. Independent Study courses may serve as an opportunity for students to expand their expertise in a particular application, to explore a topic in greater detail, or to develop more advanced skills.
Group 4	18449A001	Agricultural Machinery Service	This comprehensive machinery service course concentrates on the following areas: using service manuals, electrical applications for agricultural equipment, fundamentals of multi-cylinder engines,

			reconditioning and repairing agricultural equipment, assembling and adjusting agricultural equipment, organization and management of agricultural machinery dealerships, human relations, and sales techniques. Careers such as agricultural equipment salesperson, mechanic, parts manager, sales manager, service technician, and other related occupations will be examined. Improving workplace and computer skills will be a focus. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects is an integral course component for leadership development, career exploration and reinforcement of academic concepts.
Group 5	**18248A001**	**Agribusiness Workplace Experience**	**Agribusiness Workplace Experience courses provide work experience in fields related to agribusiness. Goals are typically set cooperatively by the student, teacher, and employer (although students are not necessarily paid). These courses may include classroom activities as well, involving further study of the field or discussion regarding experiences that students encounter in the workplace.**
Group 5	**18148A001**	**Animal Systems Workplace Experience**	**Animal Systems Workplace Experience courses provide work experience in fields related to animal systems (management, care, and/or processing). Goals are typically set cooperatively by the student, teacher, and employer (although students are not necessarily paid). These courses may include classroom activities as well, involving further study of the field or discussion regarding experiences that students encounter in the workplace.**
Group 5	**18998A003**	**Agricultural Biotechnology Systems Workplace Experience**	**Agricultural Biotechnology Systems Workplace Experience courses provide students with work experience in fields related to agricultural biotechnology. Goals are typically set cooperatively by the student, teacher, and employer (although students are not necessarily paid). These courses may include classroom activities as well, involving further study of the field or discussion regarding experiences that students encounter in the workplace.**
Group 5	**18998A004**	**Environmental Services Systems Workplace Experience**	**Environmental Services Systems Workplace Experience courses provide work experience in fields related to environmental services systems. Goals are typically set cooperatively by the student, teacher, and employer (although students are not necessarily paid). These courses may include classroom activities as well, involving further study of the field or discussion regarding experiences that students encounter in the workplace.**
Group 5	**18348A001**	**Agricultural Production and Processing Workplace Experience**	**Agricultural Production and Processing Workplace Experience courses provide students with work experience in fields related to agricultural production and processing. Goals are typically set cooperatively by the student, teacher, and employer (although students are not necessarily paid). These courses may include classroom activities as well, involving further study of the field or discussion regarding experiences that students encounter in the workplace.**
Group 5	**18548A001**	**Natural Resources Workplace Experience**	**Natural Resources Workplace Experience courses provide students with work experience in fields related to natural resources. Goals are typically set cooperatively by the student, teacher, and employer (although students are not necessarily paid). These courses may include classroom activities as well, involving further study of the field or discussion regarding experiences that students encounter in the workplace.**
Group 5	**18098A001**	**Plant Systems Workplace Experience**	**Plant Systems Workplace Experience courses provide work experience in fields related to plant systems (care, propagation, and processing). Goals are typically set cooperatively by the student, teacher, and employer (although students are not necessarily paid). These courses may include**

			classroom activities as well, involving further study of the field or discussion regarding experiences that students encounter in the workplace.
Group 5	**18448A001**	**Power, Structural and Technical Systems Workplace Experience**	**Power, Structural and Technical Systems Workplace Experience courses provide work experience in fields related to agricultural mechanics and construction. Goals are typically set cooperatively by the student, teacher, and employer (although students are not necessarily paid). These courses may include classroom activities as well, involving further study of the field or discussion regarding experiences that students encounter in the workplace.**