Agricultural Systems Certificate

Curriculum information, compiled by the Design Team faculty July & August 2023

Program-level (credential-level) competencies
PLC-1. Students can explain foundational agricultural concepts.
PLC-2. Students can select, effectively utilize, and identify faults with technologies for agricultural processes.
PLC-3. Students can exhibit employability skills, quantitative reasoning, and effective communication within an agricultural context.

Program at a Glance

Prefix	#	Title	Credit Equivalents	Competencies
ASF-C	201	Agriculture Technical Literacy	1	Digital Literacy
			0.5	Applied Technical Reading
			0.5	Applied Technical Writing
ASF-C	202	Agricultural Systems	1	General Agriculture Systems Fundamentals
			1	Animal Production Systems
			1	Crop Production Systems
ASF-C	203	Agricultural Safety	0.5	Basic Safety
			0.5	Tool Operation
			1	Food Safety
ASF-C	204	Equipment Operation, Configuration, & Troubleshooting	1	Basic Equipment Operation
			0.5	Basic Equipment Configuration
			1.5	Basic Equipment Troubleshooting
ASF-C	205	Workplace Effectiveness	0.5	Industry Communication
			1.5	Employability Skills

Notes

- Prefix code: ASF-C stands for Agricultural Systems Fundamentals-Competency-based. This is a working prefix pending confirmation that it will work for all 8 colleges (uniform prefix)
- Course numbering (201-205) and titles are placeholders
- Program is designed as a direct assessment competency-based program, with each competency assigned a credit equivalency per U.S. Dept of Education guidelines
- Curriculum design used the following steps:
    - Labor market information inputs:
        - Lightcast & McKinsey datasets showing needed skills
        - Farmworker surveys (over 11,000) with direct prospective learner needs

        - Employer interviews–over a year's worth of interviews with employers, including an employer panel at a July workshop to kick-off design
    - Creation of the program-level competencies (credential outcomes)
    - Faculty generation of knowledge, skills, behaviors, and abilities needed within program (over 250+ individual KSAB's identified)
    - Grouping of KSAB's into thematic categories, creating 14 program **competencies**
    - Creating performance indicators for each of those 14 competencies (59 performance indicators created)
    - Creation of competency assessment strategy, including summative and formative assessments (14 summative and 54 first-draft formative assessment approaches)
    - Validating competencies with employers (employer panel on August 8th collectively employ over 14,000 employees)
    - Determining competency pre-reqs/sequencing, credit equivalency, and bundling, as well as assignment of academic prefix code
- Curriculum development process included extensive employer/industry input, feedback, and validation

Course:	ASF-C 201	Agricultural Technical Literacy
Competency:	Digital Literacy	I can identify and utilize digital technology (hardware and software) used in agriculture.
	Performance Indicators	Create documents using word processing software
		Design and analyze spreadsheet applications for agriculture
		Evaluate the functions of common computer components
		Navigate computer operating and digital file systems
		Use email, contacts, and calendars
		Interpret digital maps
		Utilize and enter data accurately in farm management systems
	Summative Assessment	Digital workday simulation: Complete a series of digital tasks associated with a typical work day, including data handling, upload, populate word and excel file with simulated data for sample farm (these are samples, student would walk through a simulated situation and have to complete digital tasks)
	Formative Assessments	Identify task: Identify common computer hardware components and their functions
		Create: A formatted word document, such as a memo communicating a work schedule change
		Review and interpret: Given a digital special fertilizer application map, interpret information and create report that is uploaded to the EPA CARB website (simulated)
		Create: A calendar schedule for 7 employees from dairy cattle rumination sensor data report on farm-level MIS to check on cattle health
	Pre-reqs	None
	Weight	1 credit equivalent
	PLC Map	PLC-2, PLC-3
Competency	Applied Technical Reading	I can read and interpret agricultural industry documents.
	Performance Indicators	Read and interpret Safety Data Sheets (SDS) and labels
		Read and follow operation manual instructions, standard operating procedures, and safety guidelines
		Read and comply with laws and regulations significant to the industry workplace.

	Summative Assessment	Oral questioning: Read an agricultural manual and explain the details of of the document, follow the directions to outline a specific process
	Formative Assessments	Read and identify: Read industry documents and highlight important parts (design assessment for students to highlight important parts in several manuals)
		Read and interpret: Read industry documents and orally provide an interpretation of those documents
		Read and communicate: Read industry documents and orally communicate the necessary steps outlined in that document to another person
	Pre-reqs	Digital Literacy
	Weight	.5 credit equivalent
	PLC Map	PLC-3
Competency	Applied Technical Writing	I can write effective agricultural technical reports
	Performance Indicators	Produce reports for regulatory and employer requirements that include all requested information
		Complete technical forms and documents
		Respond to technical procedures and provide feedback in writing
		Fix documents per requests for revision and corrections
	Summative Assessment	Write: product/equipment/process/use report, incident report, quality control audit report, and/or food safety audit report
	Formative Assessments	Fill in a H2-A USCIS temporary agricultural worker form
		Form writing and comprehension: Fill in I-9 and W4 forms (NOTE: Need to check if this assessment activity collects sensitive data, and if so, is it usable).
		Write and fix scheduling memos (e.g. schedule workers to check dairy cattle health status, schedule agricultural equipment for shared use, schedule workers to processing/packaging lines in a 24x7 shift operation)
		Write: Track and record essential data assessment
		Evaluate and write: Evaluate the control parameters of an agricultural process and write report
		Edit and rewrite: Make written changes to a provided written report with errors

	Pre-reqs	Applied Technical Reading
	Weight	.5 credit equivalent
	PLC Map	PLC-3

Course:	**ASF-C 202**	**Agricultural Systems**
Competency:	General Agricultural Systems Fundamentals	I can explain agriculture industry fundamentals.
	Performance Indicators	Explain current agriculture trends.
		Explain the impact of historical and environmental events on agriculture production.
		Contextualize the importance of California Agriculture in the Domestic and Global Economy.
		Apply management protocols based on knowledge of the agriculture production systems.
		Explain the effects of various legislation and policies on agriculture.
		Diagram the food supply chain and identify challenges within that chain.
	Summative Assessment	Develop a management plan that integrates the food/fiber value chain and the driving factors (e.g. water, energy, environment markets, technology, labor, raw material). Case study information provided - Oral or Written response.
	Formative Assessments	Mind map: Create mind maps of the food and fiber value chain that illustrates agricultural trends
		Short Answer (Oral or written): Respond to questions and explain the impact of CA agriculture on the global economy
		Project: Create a management plan given a specific agriculture production scenario
	Pre-reqs	Digital Literacy
	Weight	1 credit equivalent

	PLC Map	PLC-1
Competency:	Animal Production Systems	I can explain the fundamentals of animal systems.
	Performance Indicators	Describe sustainable practices within an animal production system
		Describe U.S. Department of Agriculture (USDA) standards to various products within the animal processing industry
		Explain the impact of trends affecting livestock markets
		Execute management plans in breeding, nutrition, and health.
	Summative Assessment	Create: Build your own farm crude management plan. Choose a species and market, facility needs, sustainability practices. Assessment is individualized to student
	Formative Assessments	Interpret reading: Summarize (orally or in writing) provided articles on sustainability in animal management across three species
		Matching: Picture/definition matching using three characteristics that determine grades
		Fill Out flow chart: Showing market trends based on production
		Missing: Per discussion, add a facility-based assessment
	Pre-reqs	Digital Literacy
	Weight	1 credit equivalent
	PLC Map	PLC-1
Competency:	Crop Production Systems	I can explain the fundamentals of plant science and crop production systems.
	Performance Indicators	Apply soil-plant-water relationships in agricultural production.
		Describe the basic soil types and nutrients and the influence those have on crop management
		Implement basic integrated pest management practices
		Describe various cultural practices including organic production, climate smart agriculture, conservation tillage.

		Differentiate irrigation systems based on crop, topography, and water source.
	Summative Assessment	Create and present a crop management plan: Inclusive of irrigation, pest management, cultural practices, and nutrients.
	Formative Assessments	Written report: Create an irrigation schedule using evapotranspiration data, nutrients, and crop coefficients. Schedule must include irrigation frequency and duration.
		Oral questioning: Through provided UCIPM documentation, create and describe a pest management timeline including weed scouting, insect scouting, and disease prevention measures
		Oral presentation to a "client": Select a cultural practice of crop production and explain the advantages and disadvantages of those chosen practice for a client's needs based on a scenario (reduced tillage, organic production, climate smart)
		Missing: Add a formative assessment dedicated to nutrients (per discussion)
	Pre-reqs	Digital Literacy
	Weight	1 credit equivalent
	PLC Map	PLC-1

Course:	**ASF-C 203**	**Agricultural Safety**
Competency:	Basic Safety	I can follow workplace safety protocols using Occupational Safety & Health Administration (OSHA) standards.
	Performance Indicators	Identify workplace hazards in agriculture
		Identify, wear, and utilize the proper Personal Protective Equipment (PPE) for a job
		Perform proper lockout tagout (LOTO) procedures and follow OSHA and employer instructions
		Identify confined space hazards and comply with OSHA general industry and agriculture procedures
	Summative Assessment	Demonstration: Stations (~10) where a student will identify a hazardous situation, recommend corrective actions to remedy the situation, and demonstrate the proper use and application of the safe corrective action

	Formative Assessment	Multiple Choice/equipment test: Hazard hunting on a piece of equipment
		Simulation: Moving from one side of a plant to the other, the student will identify PPE required for that area. Identify PPE and give an application where and how that PPE is used
		Demonstration: Lock out a piece of equipment and demonstrate the procedure for shutting machine down and restarting
		Matching: Identify by picture confined spaces and list requirements for working in those areas
	Pre-reqs	Digital Literacy
	Weight	.5 credit equivalent
	PLC Map	PLC-3
Competency:	Tool Operation	I can safely use basic hand and power tools.
	Performance Indicators	Select and effectively use common hand tools (e.g. wrenches and screwdrivers) for a given agricultural application using appropriate personal protective equipment (PPE).
		Safely utilize powered tools using appropriate clamping, cutting fluid, technique, and personal protective equipment (PPE).
	Summative Assessment	Demonstration: Students will complete a project where they have to select and use both hand and power tools as well as PPE
	Formative Assessment	Project: Students will be given a project where they have to complete it using the correct hand tools and PPE
		Project: Students will be given a project where they have to select the correct power tools to complete. Will also select the correct PPE.
		NOTE: May need additional formative assessments to check for understanding before project
	Pre-requisites	Basic Safety
	Weight	.5 credit equivalent
	PLC Map	PLC-2
Competency:	Food Safety	I can implement best practices to meet manufacturing, food safety, and sanitation requirements.
	Performance	Follow federal and state inspection rules, regulations, and

	Indicators	policies
		Explain the protocols for quality control procedures and sanitation for manufacturing and processing
		Demonstrate proper personal hygiene and dress code
		Follow Occupational Safety & Health Administration (OSHA) equipment safety guidelines including points of contact for contaminant exposure
		Follow guidelines, procedures, and the company handbook with respect to processing and packaging systems
	Summative Assessment	Processing Line Simulation: (lab-based or virtual simulation). Students have to identify and demonstrate multiple stages of food safety and regulations on a processing line, including: PPE, sanitation, verbalize compliance, identify hazard points, OSHA
	Formative Assessments	Matching Exercise: Identify points of contact for contaminant exposure on a map of equipment
		Matching Exercise: Locate hazardous contaminants in relation to OSHA safety
		Matching Exercise + Explanation: Differentiated between compliance and non-compliance of the following images, explain the correct format
		Oral questioning: Verbally communicate federal and state inspection rules, regulations, and policies for a series of examples, explain workplace applicability
		Multiple choice: Choose the following correct policy and procedures pertaining to processing and packaging systems
	Pre-reqs	Basic Safety
	Weight	1 credit equivalent
	PLC Map	PLC-1

Course:	**ASF-C 204**	**Equipment Operation, Configuration, & Troubleshooting**
Competency:	Basic Equipment Operation	I can safely operate electronic and mechanical equipment used in agriculture.
	Performance Indicators	Demonstrate control of electronic systems on a main control panel and via connected devices

		Energize and de-energize an operator control panel that includes circuit breakers, on/off switch, and hand on and auto (HOA) selector switch
		Define the purpose of an emergency stop in a system, when to use it, and when not to use it
		Operate basic agricultural equipment and machinery successfully
	Summative Assessment	Simulation/role play: Using a conveyor sorting (or related ag equipment), demonstrate effective use of the control panel, electronic systems, control circuit breaker, on/off switch, HOA, e-stop, and operate the conveyor with manual product
	Formative Assessment	Knowledge checks: Content knowledge checks throughout content confirming understanding of equipment
		Oral exam: electrical control panel systems and use of the emergency stop
		Simulation: Demonstrate use of the operator control panel, circuit breaker, on/off switch, and HOA selector switch
		Oral questioning: After simulation of e-stop status, function, and operation, describe when it is used and not used and the conditions of its use
		Direct observation: Monitor safe operation of ag equipment in a lab setting
	Pre-reqs	Basic Safety
	Weight	1 credit equivalent
	PLC Map	PLC-2
Competency:	Basic Equipment Configuration	I can safely set up electrical and mechanical equipment in agricultural tasks.
	Performance Indicators	Adjust settings on an operator's panel for systems
		Modify mechanical settings using appropriate techniques
		Measure in decimals and fractions accurately using measuring tape and a ruler
	Summative Assessment	Performance-based: Students will be given a piece of equipment that they will have to configure for an operation
	Formative Assessments	Knowledge checks: Content knowledge checks throughout content confirming understanding of equipment
		Demonstration: Students will calibrate a piece of equipment and describe results

		Demonstration: students will calibrate a seeder/planter/industrial equipment and will verify anticipated result through precision measurement
	Pre-reqs	Basic Equipment Operation
	Weight	.5 credit equivalent
	PLC Map	PLC-2
Competency:	Basic Equipment Troubleshooting	I can troubleshoot basic electrical, mechanical, and software systems and communicate identified issues effectively.
	Performance Indicators	Verify sensor status operation
		Verify power status using a multimeter in low voltage (less than 30 volts) applications
		Identify and differentiate between electrical, electronic, mechanical, hydraulic, and pneumatic components
		Identify the difference between normal operating conditions and abnormal conditions and report appropriately.
	Summative Assessment	Direct observation of a demonstration: Using provided agricultural related equipment simulating malfunction, demonstrate identification of electrical, electronic, mechanical, software, power, and sensor information and communicate findings orally
	Formative Assessments	Multiple choice: Match components to correct electrical, electronic, mechanical, hydraulic, and pneumatic components (multiple assessments)
		Hands on demonstration: Given a piece of equipment, demonstrate how you would identify places you would troubleshoot
		Observation & questioning: Verbally identify normal and abnormal operating conditions of equipment
		Missing: Missing additional formative assessments per discussion, need to add a few more
	Pre-reqs	Basic Equipment Configuration
	Weight	1.5 credit equivalents
	PLC Map	PLC-2, PLC-3

Course:	**ASF-C 205**	**Workplace Effectiveness**

Competency:	Industry Communication	I can communicate effectively using industry methods within an organizational structure.
	Performance Indicators	Navigate an organizational structure for communicating effectively
		Explain the importance of an emergency action plan and hazard communication policy
		Explain workplace policies on scheduling, breaks, safety training, cell phone usage, personal protective equipment (PPE), and photography
	Summative Assessment	Written email/case study: Interpret a case study to identify workplace policies that pertain to a specific emergency/hazard scenario and create an email (and/or text) addressing concerns and outlining a solution to the appropriate contact
	Formative Assessments	Matching/FIB: Review workplace handbook and identify important sections, including workplace policies and procedures
		Matching/FIB: Review emergency action plan and hazard communication policy
		Write: Create an email chain or text message to the company chain of command based on company org chart
	Pre-reqs	Digital Literacy
	Weight	.5 credit equivalent
	PLC Map	PLC-3
Competency:	Employability Skills	I can demonstrate leadership and interpersonal skills in a professional setting.
	Performance Indicators	Demonstrate time management by creating and utilizing time logs, schedules, and calendars
		Model initiative by showing up on time, performing task to completion, and setting measurable short and long term goals
		Model integrity by adhering to a workplace code of conduct
		Demonstrate conflict resolution strategies that improve workplace culture
		Collaborate by effectively leading and working in a team setting
	Summative Assessment	Verbal interview: Exit interview with review of the following components: Create calendar of work schedule and time sheet/attendance logs showing task completion; Create and

		present short and long term goals; Explain employer's code of conduct and how they utilize it in daily tasks; Explain workplace environment and team participation; define challenges personally, professionally, and in coursework
	Formative Assessment	Scenario review: Given a series of scenarios, identify and explain the correct conflict resolution strategy
		Self-reflection: Describe a situation where you were working as a team and were challenged. What did you do? What would you do differently?
		Develop a goal plan: Create 3 short and 3 long term SMART goals, and a corresponding action plan
		Interpret a scenario: Given a business code of conduct scenario, describe what ethical choices are involved and what you would make
	Pre-reqs	Digital Literacy
	Weight	1.5 credit equivalents
	PLC Map	PLC-3