

Narrative: Agriculture Systems – Agriculture Foundation Certificate (CBE Credit)

Merced Community College District

Item 1. Program Goals and Objectives

California's Central Valley is a food producing powerhouse with the world's largest supply of Class I soil and 13,650 farming enterprises. Food production and processing is the foundation of the Central Valley economy, generating about 88,000 jobs representing 30% of all employment. More than 70% currently are low-skill, low-wage jobs with high potential for automation. However, the region's talent system struggles to help workers meet existing employer demands and fulfill evolving skills needs as industry adopts ag-tech innovations to remain competitive and improve job quality. The result is a cycle of persistent poverty that threatens the region and, therefore, the nation's food supply.

Agriculture Systems certificate program develops a skilled, next-generation workforce to support advanced, sustainable food production and manufacturing through the following three pillars:

- 1. Industry-aligned, interdisciplinary workforce training and pathways**
- 2. Competency-Based Education (CBE)**
- 3. Connecting talent to industry**

Ultimately, we are bridging a skills gap so that workers are prepared to take on the jobs that are emerging while also introducing them to a community college system in which they can explore pathways to build their skills. The core skills within this certificate include:

Item 2. Program Description

The lack of standardization and a universally recognized training structure in the agriculture industry makes designing a certificate challenging. We had to consider both the foundational skills required in agriculture - especially in electrical and mechanical competencies - as well as our target student workers on the field known as pickers. Our faculty design team, representing various disciplines across the eight colleges, worked diligently to determine the core skills needed.

Core Skills

- 1. Digital Literacy**
- 2. Basic Equipment Operation**
- 3. Basic Equipment Configuration**
- 4. Basic Equipment Troubleshooting**
- 5. General Agriculture Systems Fundamentals**
- 6. Crop Production Systems**
- 7. Tool Operation**
- 8. Applied Technical Reading**

- 9. Employability Skills
- 10. Animal Production Systems
- 11. Food Safety
- 12. Basic Safety
- 13. Industry Communication
- 14. Applied Technical Writing

To assess mastery of these core skills, we also defined 59 performance indicators to outline what students need to demonstrate for each skill. While these core skills might initially appear advanced, it's crucial to note that their evaluation will occur at a foundational level. These carefully chosen skills, aligned with industry demands, are designed to equip students with an understanding of the entire agricultural value chain. This proficiency allows them to seamlessly navigate various scenarios and adapt to the evolving industry landscape.

Program Student Learning Objectives

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.

Item 3. Program Requirements

Prefix	#	Title	Credits
AGAT	1	Agricultural Technical Literacy	2
AGAT	2	Agricultural Systems	3
AGAT	3	Agriculture Safety	2
AGAT	4	Equipment Operation, Configuration & Troubleshooting	3
AGAT	5	Workplace Effectiveness	2

Title	Credit Equivalents	Competencies
Agriculture Technical Literacy	1	Digital Literacy
	0.5	Applied Technical Reading
	0.5	Applied Technical Writing
Agricultural Systems	1	General Agriculture Systems Fundamentals
	1	Animal Production Systems
	1	Crop Production Systems
Agricultural Safety	0.5	Basic Safety
	0.5	Tool Operation
	1	Food Safety
Equipment Operation, Configuration, & Troubleshooting	1	Basic Equipment Operation
	0.5	Basic Equipment Configuration
	1.5	Basic Equipment Troubleshooting
Workplace Effectiveness	0.5	Industry Communication
	1.5	Employability Skills

- See attached Competency Based Education Curriculum For each course above.

Item 4. Master Planning

This certificate supports the EMP vision “Enriching our community through educational experiences and support services including: Career technical education, workforce training, lifelong learning and tying the agriculture community into the program through the curriculum development which is industry influenced. This program includes multiple modalities like online, face to face and competency based. This allow the certificate courses to be offered in a more flexible schedule that meets the needs of our students. The hub of many of the lab experiences will be the Merced College campus Agriculture Innovation Center. This certificate is a crucial part of the AG TEC Grant in which Merced College is the lead community college in the regional collaborative. The Agriculture systems program meets the strategic partnership vision of the EMP by not only breaking the silos within disciplines at Merced College to create a program that combines multi discipline collaboratives but has developed a certificate that is collectively developed by eight community colleges in the region.

Item 6. Career Opportunities and Labor Market Data

SOC	Description	2022 Jobs	2022 Resident Workers	2022 Net Commuters	2022 Employment Concentration	Regional Completions (2021)	Median Hourly Earnings
11-9013	Farmers, Ranchers, and Other Agricultural Managers	2,810	2,694	116	9.20	54	\$17.20
19-4012	Agricultural Technicians	74	84	(10)	6.75	0	\$16.79
45-2011	Agricultural Inspectors	19	26	(8)	2.34	0	\$21.91
45-2041	Graders and Sorters, Agricultural Products	242	375	(133)	10.77	0	\$15.08
45-2091	Agricultural Equipment Operators	445	459	(14)	12.26	54	\$14.75
45-2099	Agricultural Workers, All Other	578	572	6	14.67	0	\$14.87
49-3041	Farm Equipment Mechanics and Service Technicians	113	117	(4)	5.31	54	\$22.37
49-9041	Industrial Machinery Mechanics	292	300	(8)	1.35	2	\$28.05
51-1011	First-Line Supervisors of Production and Operating Workers	345	433	(88)	0.98	0	\$29.03
51-3099	Food Processing Workers, All Other	192	156	36	6.95	0	\$17.41
		5,111	5,217	(106)			

Exhibit 4. Top occupational titles in job postings for agricultural technology

Occupational Title	Job Postings	% of Job Postings
Quality Control Analysts	208	78%
Agricultural Technicians	34	13%
Food Science Technicians	11	4%
Precision Agriculture Technicians	8	3%
Agricultural Inspectors	3	1%
Life, Physical, and Social Science Technicians, All Other	3	1%

Salaries

Exhibit 5 shows the “Market Salaries” for agricultural technology occupations. These are calculated by Burning Glass using a machine learning model built off of millions of job postings every year. This accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

Exhibit 5. Salaries for agricultural technology occupations

Market Salary Percentile	Salary Amount
10th Percentile	\$28,375
25th Percentile	\$32,953
50th Percentile	\$38,263
75th Percentile	\$47,438
90th Percentile	\$67,249

Item 7. Similar Programs at Other Colleges in Service Area

There are no other colleges within our service area providing a CBE driven Agriculture Systems certificate. However, this certificate is a collaborative effort among 8 community colleges as an integral part of the F3 Ag TEC Grant. The objective is to provide an AG TEC certificate that is the same across all campuses. Thus, providing resources, industry and instructor expertise and Innovation Center research facilities to increase agriculture technology research, upskilling the workforce and providing entrepreneurial hubs for Ag Tec companies, this in return is to provide students more employment opportunities for higher wages while remaining in our local communities.

Advisory Committee Recommendation

Advisory Committee Members

- Darrell Smith, Chief Relations Officer at DCSH Inc
- Steven Warren, Director of HR at Harris Ranch
- Joe Del Bosque, Del Bosque Farms
- Luke Hemphill, Bluewhite Robotics
- Brett Zall, Vice President of Human Resources at Fowler Packing
- Chris Wolfe, Woolf Farming

Survey information was received from over 40 agriculture companies within the San Joaquin Valley. These surveys were followed up by phone calls and additional meetings to garner more focused feedback. The survey findings emphasized the importance of applied math skills,

workplace safety, agricultural terminology, basic computer skills, and communication in the agricultural industry. Respondents' job preferences reflect a focus on efficient irrigation, analytics, processing automation, and agricultural mechanics. These insights helped inform the future development of training programs, educational initiatives, and job placement strategies tailored to the needs and interests of agricultural professionals in the Merced, Madera, Fresno, Tulare, and Kings regions.

Additionally, phone interviews and panels were conducted to further validate their responses. The insight gained from the phone interviews revealed a clear consensus: the certificate should prioritize basic math and soft skills. Industry partners unanimously expressed support for competency-based education, yet concerns lingered about the feasibility of rapid implementation.

In parallel, two faculty panels convened on July 10th and August 7th. The panel discussions underscored the need for the certificate to lay a solid foundation of skills, serving as a springboard for further development on the job. Confidence in assuming leadership roles has emerged as a key requirement. Soft skills took center stage, with a strong emphasis during discussions.

The practicality of writing and reading reports to prevent work duplication was highlighted. Repeatedly, industry partners emphasized their readiness to incentivize employees who proactively complete the program. This, they believe, would signal an eagerness to embrace multifaceted roles and lead to potential wage premiums.

After review of the Courses below and a panel discussion with the design faculty committee the course and certificate program were approved by majority voice vote.

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AGAT	1	Agricultural Technical Literacy	2
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Estimated time to program completion 1 year