

Bakersfield College's Bachelor of Science in Industrial Automation

REPORT TO THE LEGISLATIVE ANALYST'S OFFICE
SITE VISIT | OCTOBER 23, 2019

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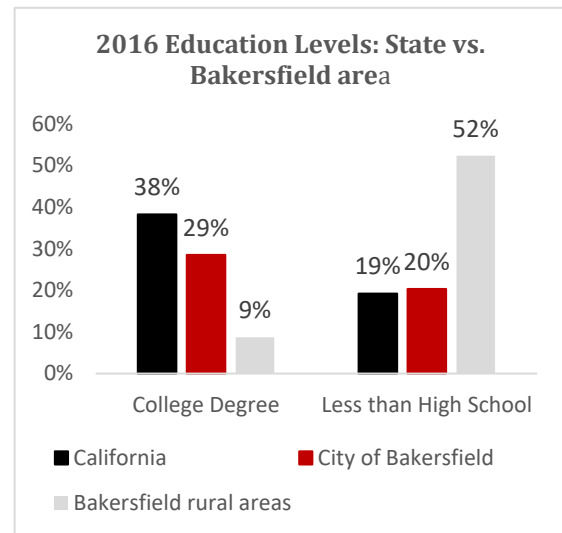
ABOUT BAKERSFIELD COLLEGE

*Bakersfield College provides opportunities for students from diverse economic, cultural, and educational backgrounds to attain Associate and **Baccalaureate degrees** and certificates, workplace skills, and preparation for transfer. Our rigorous and supportive learning environment fosters students' abilities to think critically, communicate effectively, and demonstrate competencies and skills in order to engage productively in their communities and the world. – BC's Mission Statement*

Bakersfield College (BC) serves over 37,000 students annually and we continue to grow, having seen a nearly *50 percent increase* in enrollment in the past five years. Bakersfield College plays a critical role in improving the quality of life for the great majority of the citizens of Kern County who come from underserved communities. For most, higher education is the only way they can attain any measure of a middle class standard of living.

Service-Area Educational Attainment: According to data reported by the California Department of Education, Kern County's baccalaureate attainment rates are of significant concern at roughly half the statewide rate. In rural service areas like Arvin, fewer than three in every 100 residents holds a bachelor's degree or higher. Over 28 percent of those in BC's service area lack a high school diploma.

Even beyond the borders of Kern County, there is a widely recognized shortage of educated workers in California. The Public Policy Institute of California has estimated that the state will have a shortfall of 1 million workers with bachelor's degrees by 2025.¹



Service-Area Poverty & Unemployment: The per capita income in the area is among the lowest in California, at just \$21,094– well below the state average of \$31,458. The U.S. Bureau of Labor Statistics reports that the unemployment rate in Kern County well exceeds the national rate at 7.4% as of November 2017, while nearly a quarter of residents live below the poverty line. In many of our service-area rural communities, residents experience poverty rates topping 35% and debilitating unemployment over double the national average.

Service-Area Industry Landscape: Agriculture remains the economic base of the Bakersfield area; California's Central Valley is the most productive agricultural region in the U.S. and a critical part of the nation's food supply. Across all industries in Kern County, BC has diligently prepared our graduates for careers that meet industry demand. In 2015, The Brookings Institution ranked BC first in California and sixth in the nation for value-added mid-career earnings for alumni.

With Kern County known as one of the largest agricultural and oil producers in the country; it is no surprise Bakersfield College's expansive list of vocational, technical, and career-driven programs have captured attention statewide. In January 2015, the California Community Colleges Chancellors Office announced their selection of BC as one of 15 California colleges to pilot a four-year Bachelor of Science (B.S.) in Industrial Automation (INDA).

BACHELOR OF SCIENCE IN INDUSTRIAL AUTOMATION: BC'S WHY

Why Industrial Automation: With industries rapidly moving to utilize automated processes and with the evolution of technology, robotics, and artificial intelligence, automation has been a high priority among Bakersfield College faculty. When presented to the Academic Senate in 2014, BC faculty were particularly energized by a broadly applicable curriculum, which has been intentionally designed to cut across all industries, preparing graduates to succeed many fields statewide and nationally.

Meeting Workforce Demands: Bakersfield College's BS in Industrial Automation has been visionary in serving as the central provider of highly qualified graduates for positions in the Central Valley. Automation has decreased cost while increasing productivity, leading to growth in the STEM industry in the Central Valley. The program's unique specialization in automation supplies a steady, well-qualified workforce to companies in the Central Valley that have traditionally outsourced work to meet demand.

The lower Central Valley has a large base of production and logistics facilities in the following industry sectors: agricultural products processing, materials processing, manufacturing, aerospace, energy (petroleum, cogeneration, renewables), warehousing/logistics, and infrastructure/utilities. Each industry sector has a need for technical management, industrial safety, quality assurance, and other positions requiring more than an associate degree or two-year certificate of achievement. EMSI data for occupations in Kern County potentially included in the baccalaureate degree include:

SOC	Occupation	2019 Jobs	2024 Jobs	Median Hourly Wage
11	General & Operations Managers	3,379	3,640 (+8%)	\$54.44
17	Engineers, All Other	636	652 (+3%)	\$51.59
41	Sales Representatives, Wholesale	270	273 (+1%)	\$38.01
41	Sales Engineers	55	54 (-2%)	\$51.34
Total/Average		4,340	4,619 (+6%)	\$52.94

Figure: Occupation Data from EMSI Q4 2019 Data Set

Rigor of the Baccalaureate: Bakersfield College purposefully opted to pursue a baccalaureate degree program for myriad reasons:

Workforce demand for baccalaureate qualifications

According to EMSI, 20.2% of all jobs posted between 9/2016 and 10/2019 required a baccalaureate degree (43,086/212,453). Searching for all job postings requiring "programmable logic controllers" resulted in 212 requiring a baccalaureate out of 689 posting, or 30.8%. The same parameters for 5/18-10/19 resulted in 123 out of 399 requiring a baccalaureate, or 30.8%.

Promotional opportunities and skill development

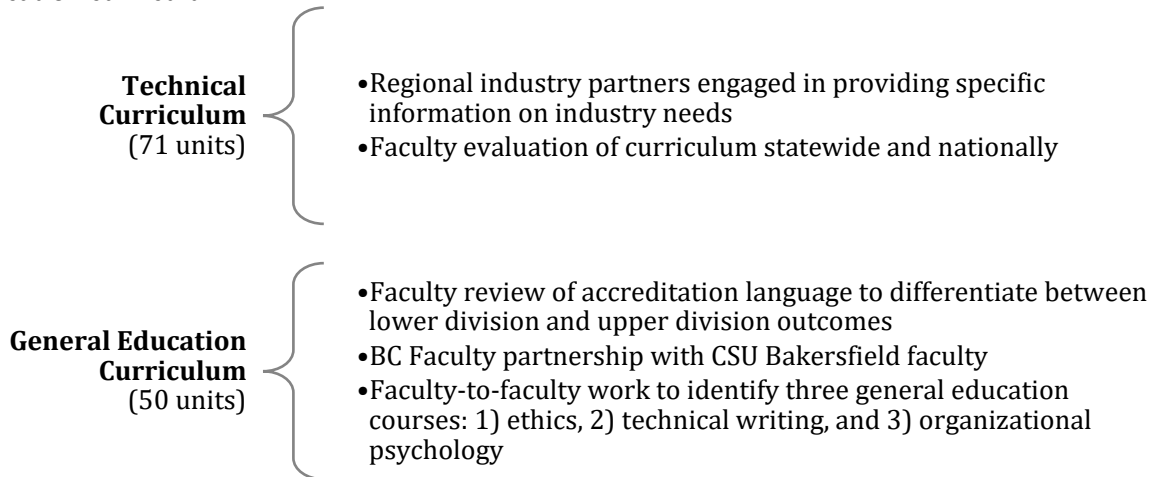
Employers have invested in costly employee development and training, often outsourcing work overseas. BC's B.S. program is filling skill gaps. For example, BC's Project Management and Systems Design Integration courses are tied to planning, problem solving, and results-oriented skills at job sites throughout Kern County as requested by the college's Industry Advisory Board.

Program Affordability and Specificity

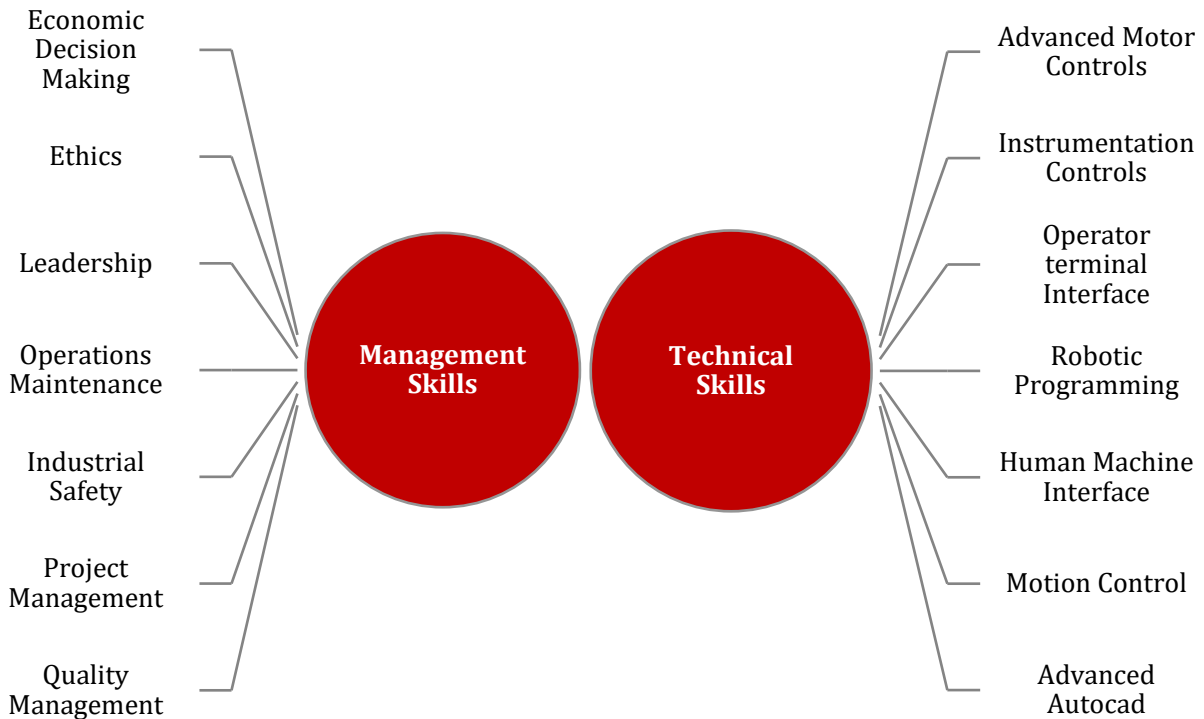
California State University Bakersfield (CSUB) cost of attendance is **nearly three times more expensive** than BC at \$7,418 per year for a total cost of \$29,672 compared to less than \$10,000 for BC's full four-year degree. BC also offers additional financial aid through AB19 funds, further reducing fees for qualifying students.

CURRICULUM DEVELOPMENT & PROGRAM STRUCTURE

Who: Bakersfield College relied heavily on input from its Advisory Committee of industry professionals to assist faculty in tailoring program outcomes to a broad base of job skills. As such, BC organized its curriculum development into two groups focused on technical and general education curriculum.



Key Skills and Competencies: Bakersfield College designed the B.S. program to focus on two key competencies to address the entry-level management skills employers are seeking:



Student Learning Outcomes: Bakersfield College developed B.S. degree outcomes and assessment tools through discussions with CSU and the industry partners. A review of upper division curricular outcomes indicate high level student outcomes such as “create, design, diagnose, propose processes, implement processes, evaluate, synthesize, examine” and the program outcomes focus on competency in the specific field including technical and management competencies.

Intentional Course Calendar: Bakersfield College has scheduled courses to optimize accessibility for a diverse student population with varied needs. Course scheduling includes 1) day courses, 2) night courses, and 3) online/hybrid courses. To accommodate student needs, BC has implemented the following in its course calendar:

1. Changed six hands-on lab courses to hybrid, moving lectures online with one day/week in-person classes; 45% of courses are approved to be taught in a hybrid environment
2. Rotate courses between day and night to improve working students’ access
3. Offer eight lecture courses online; 55% of courses are approved to be taught online
4. Cohort-minded scheduling to improve student collaboration during the four year program

PROGRAM COSTS & STAFFING

Upfront vs. Ongoing Costs: Bakersfield College’s financial resources are sufficient to support and sustain the Bachelor of Science in Industrial Automation program. Program staff have been fiscally prudent and leverage categorical and grant dollars to purchase equipment and assist in scale. Categorical and other grant funding sources include Strong Workforce funds and legislated funding to support rural expansion as secured by Assemblyman Rudy Salas.

The financial expenditures illustrated in the table below ensure financial stability of the program:

	2015-16	2016-17	2017-18	2018-19
Expenditures	\$377,395	\$554,809	\$460,882	\$365,000*

**Expenditure Report in-progress with the Kern Community College District*

The B.S. in Industrial Automation program follows the same program review process as the rest of the college’s programs and units, ensuring program resources are feasible and effective for the program in line with the college’s annual and long-term evaluation and planning efforts.

Faculty Profile: Bakersfield College has a robust team of 13 faculty, staff, and administrators fully assigned to support the B.S. program. Faculty assignments are curriculum-driven, with some faculty specializing in upper division or lower division coursework based on expertise. See Appendix A for a distribution of faculty assignment by course. The team includes:

<i>6 Full-Time Discipline Faculty</i>	-Maryham Jalalifarahani, Engineering -Michael Larson, Electronics -Thomas Rush, Electronics & INDA	-Paul Murray, INDA -Bonnie Hammond, Electronics -Travis Steele, Engineering
<i>5 Adjunct Discipline Faculty</i>	-Samuel Gomez, Engineering Manager at Tasteful Selections -Mark Tracy, Engineering Specialist at Target Distribution -Shawn Hatton, Automation Engineer at Tyrion Integration -Dawn Moseley, 2018 Cohort Graduate	
<i>1 Counseling Faculty</i>	Cynthia Quintanilla	
<i>1 Program Manager</i>	Aubrey Priest	

Course enrollment data:

	2014-15	2015-16	2016-17	2017-18	2018-19
Course Count	10	10	10	10	11
Section Count	32	36	38	45	52
1st Day Enrollment	650	755	720	684	762
Census Enrollment	624	726	701	626	844
Mean Students per Section	19.5	20.2	18.4	13.9	16.2
First Day Waitlist	99	97	91	26	26

Program Structure: The unit distribution for lower and upper division coursework in Bakersfield College's B.S. program is:

41	Lower Division General Education
29	Lower Division Technical
9	Upper Division General Education
42	Upper Division Technical

121 Total Units

The average class size is 24 students. Since implementing the Bachelor of Science in Industrial Automation, Bakersfield College has increased lower division courses, particularly in dual enrollment and articulation settings at local high schools. The college has not made any reductions in lower division offerings to make room for upper division coursework.

STUDENT SERVICES & SUPPORT

Bakersfield College has a dedicated **counselor** to provide academic counseling services to the B.S. cohort. A member of the **Admissions & Records Office**, in conjunction with the Electronics Technology faculty, evaluates official transcripts to determine if the learning outcomes are comparable to the pre-requisite courses for the upper division program. The B.S. counselor manually tracks each student's progress through application to acceptance into the program.

Completion Coaching Community: Additionally, the B.S. program is a part of the Learning & Career Pathway for Industrial Technology & Transportation meta-major, which includes a Completion Coaching Community to help students receive the support they require for financial aid, educational advising, discipline expertise, academic development, and student support.

The **BC Library** is building a collection to support the B.S. in Industrial Automation program and has acquired the EBSCO Applied Science & Technology Source database, and provides links on the library website to online journals related to the program. The B.S. faculty and librarians collaboratively select resources.

ENROLLMENT & STUDENT PROFILE

Applications & Enrollment: On average, Bakersfield College receives approximately 34,000 applications to the college annually. To improve tracking for lower division students and create a direct pathway into upper division coursework, Bakersfield College began offering an Associate of

Science in Industrial Automation in fall 2018. This development has facilitated improved tracking and strengthened the pipeline for targeted recruitment.

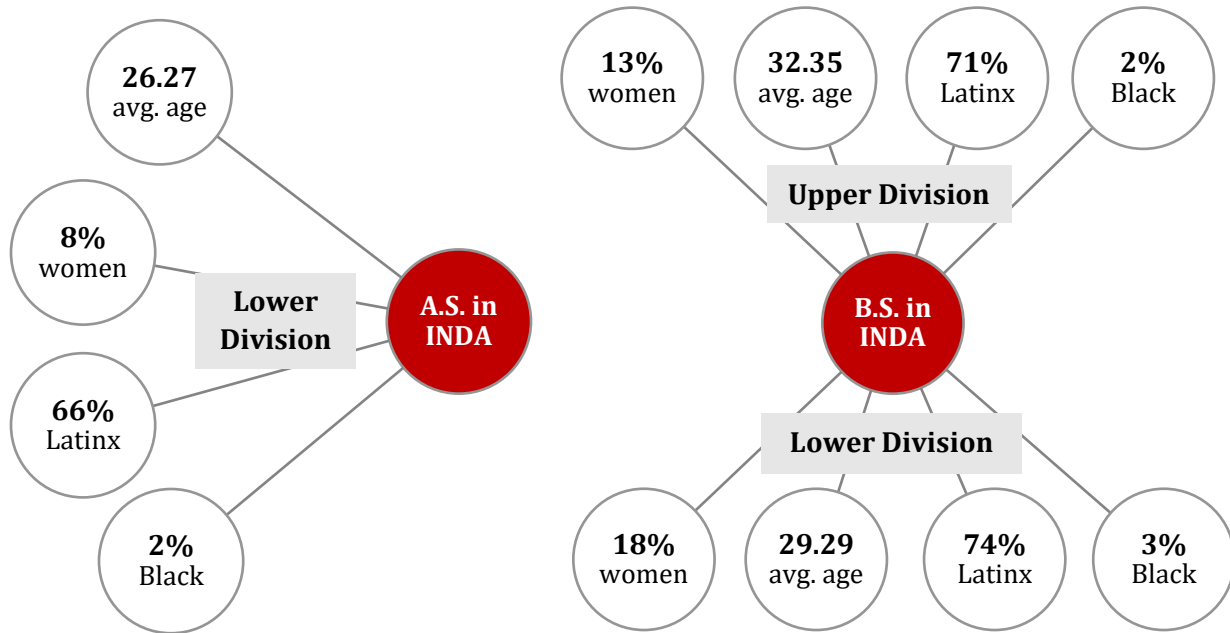
In addition to lower and upper division Industrial Automation program enrollment, many students enrolled in the Associate of Science in Electronics program are on path to enter upper division coursework in the B.S. program. From 2012 to 2016, enrollment in Electronics Technology courses increased 69% and students declaring Electronics Technology as a major increased 4%.

Program enrollment from 2016 to 2019 shows marked growth:

	2016-17	2017-18	2018-19	2019-20
Lower Division – A.S. in Electronics	214	201	220	204
Lower Division – A.S. in INDA	--	--	48	51
Lower Division – B.S. in INDA	30	68	96	86
Upper Division – B.S. in INDA	13	18	17	14
TOTAL	257	287	381	355*

**partial enrollment data available for 2019-20*

Student Profile: While Bakersfield College’s student population is increasingly diverse, with 80% of students requiring financial aid and 70% enrollment among Latinx students, so, too, is the Bachelor of Science in Industrial Automation program. Highlights include:



Additional highlights include:

- Approximately 25% of students enrolled are working full-time
- Of those who have completed or are currently enrolled in upper division coursework, 3 students have earned a bachelor’s degree or higher prior to starting the program
- Nearly 60% of students attend part-time

Intentional Recruitment: In addition to traditional recruitment activities, Bakersfield College’s B.S. program staff have implemented three high-yield strategies to increase program enrollment and completion leading to steady enrollment growth projections over the next 5 years. Strategies include: 1) transfer partnerships, 2) articulation via the C-ID project, and 3) Early College.

Transfer Partnerships	Articulation via C-ID Project	Early College Partnerships
<ul style="list-style-type: none"> •Clovis Community College •College of the Sequoias •Fresno City College •Madera Community College •San Joaquin Delta College •Taft College •West Hills College 	<ul style="list-style-type: none"> •EE100 (DC) •EE105 (AC) •EE140 (PLC Fundamentals) •EE142 (Computer Integrated Manufacturing) •EE144 (PLC Advanced) •EE150 (Instrumentation and Process Control) •EE155 (Motors and Controls) •EE160 (Telecommunications) •EE165 (Radio Communications) 	<ul style="list-style-type: none"> •Regional Occupational Center •Robert F. Kennedy High School - Delano •McFarland High School •Wasco High School •Bakersfield High School •West High School •Frontier High School

Bakersfield College aims to address equity through these initiatives by improving our reach of first-generation, low-income students. All transfer partnerships currently in place are among Central Valley Colleges while nearly all Early College partnerships are among schools in rural communities.

Bakersfield College’s intentional recruitment will create a pipeline for students to enter the baccalaureate program beginning as early as the 9th grade with 374 high school students already on a Comprehensive Educational Plan track to the baccalaureate degree. See Appendix B for a sample CSEP the B.S. counselor created with a high school student.

Projected Growth: Bakersfield College has set aggressive completion targets in line with its recruitment agenda. The college grew its graduating class from 7 in 2018 to 13 in 2019. BC anticipates another 13 graduates in 2019 and seeks to reach 40 graduates by 2022 – an increase of 471% in a 5-year period. In addition, the 374 high school students on the path toward B.S. completion at BC are projected to complete their degrees as follows:

	2020-2022	2023	2024
Projected Early College B.S. Graduates	14 (3.8%)	143 (38.1%)	196 (52.4%)

As BC scales its Early College efforts to additional high school sites, so, too, will Early College B.S. in Industrial Automation students. Projecting double the Early College high school site participants in the next 3 years, BC could see as many as 678 additional B.S. graduates in 2023-2024.

To support program expansion, Bakersfield College is also currently expanding lab space in the new STEM building with an expected completion date of 2023 using Measure J Bond funds.

PROGRAM OUTCOMES: EMPLOYMENT & WAGES

Graduate Employment and Wage Data:

Graduates of Bakersfield College's B.S. in Industrial Automation are doing very well, with 90% of students employed in jobs requiring more than an Associate's degree.

The average graduate is earning approximately \$57,000 annually – well above Kern County's per capita income of just \$21,000. The table to the right shows a sample of job titles and salaries for graduates of the B.S. in Industrial Automation program.

I & E Technician Trainee	\$60,000
Automation Specialist	\$55,000
Controls Engineer	\$70,000
Test Engineer	\$70,000
Controls Technician	\$50,000
Control Engineer	\$75,000
Automation Engineer	\$56,000
Automation Specialist	\$34,000
Field Engineer	\$65,000
Industrial Automation Specialist	\$35,000
Automation & Controls Engineer	\$60,000

STUDENT FEEDBACK

According to student surveys, students have reported the following benefits of the program:

<i>How did you hear about the program?</i>	Information session led by program faculty while pursuing an A.S
<i>Which courses have you found most helpful?</i>	Management, Industrial networking, advanced instrumentation, excel, ethics, and industrial psychology
<i>Why did you choose to enroll?</i>	Cost of the program; job prospects after graduation; workplace readiness; applicability of degree in almost every industry
<i>What would you be doing if not for the B.S. program?</i>	I would have found work as a drafter; would have dropped out of school without a degree

Student testimonials:

- *The academic rigor of the upper division courses kept me interested.*
- *It is an honor and a privilege for me to say that I am one of a small group of graduates who hold a Bachelor of Science degree from Bakersfield College.*
- *I was fully satisfied for myself that the possibilities for application of this degree are growing in almost every industry and the wage ranges that I found were appealing.*
- *Since graduation, I have become employed and I have full coverage for medical, dental, and vision. I am no longer dependent upon Medi-Cal and I will not default on student loans because my skill set has proven valuable to my employer.*

Chad Hidalgo, Class of 2019 B.S. in Industrial Automation graduate also wrote about the importance of program continuation and expansion statewide:

Bakersfield College has poised itself to facilitate the needs of both students and the community that they serve by partnership with industry advisors. I firmly believe that the Legislative Analyst Office must advise the State of California to affirm the bachelor's degree program permanently. To discontinue the program would be a disservice to the communities that are served, the people of the State of California, and industries across the nation that will greatly benefit from the invaluable training that is offered at a price point that makes it possible to attain.

APPENDIX A: Faculty Assignment by Course

Core Electronics/INDR Courses – 27 Units (3 units/each)		
Course	Name	Professor
ELET B1a	Basic Electronics DC	All
ELET B1b	Basic Electronics AC and Analog	Caras
ELET B3	Intro to PLCs	Fernandez
ELET B4	Computer Integrated Manufacturing	Fernandez
ELET B55a	Motors and Control	Caras
ELET B56	Instrumentation	Rush
ELET B58	Advanced PLCs CLX 5000	Murray
ELET B61	Telecommunications	Allard
INDR 12	Intro to Drafting and CAD	Rigby

INDA Courses – 39 units (3 units/each)		
Course	Name	Professor
INDA B100	Industrial Design Graphics	Rigby
INDA B105	Materials Science for the Technician	Jalalifarahani
INDA B110	Industrial Automation Networks (HMI)	Allard
INDA B114	Industrial Safety	Jones
INDA B120	Industrial Automation Systems (Robots)	Fernandez
INDA B122	Process Control (Adv Instr and Motors)	Rush
INDA B125	Operations Management	Fernandez
INDA B132	Project Management	Jalalifarahani
INDA B135	Economic Decision Making	Fernandez
INDA B140	Quality Management	Allard
INDA B143	Maintenance Management	Rush
INDA B144	Leadership	Allard
INDA B150	Senior Project	Murray

APPENDIX B: Early College Comprehensive Student Education Plan

10/22/2019

My Industrial Automation BS for New Students Plan

My Industrial Automation BS for New Students Plan

Industrial Automation BS for New Students

Student ID: #0000000000

CSU General Education

Plan Status: Approved

Email: ruben.tafolla3442@email.bakersfieldcollege.edu

Catalog Year: 2019-2020

Institution: KCCCD

Term	Course Information	Units
Fall 2021 16 Units	COMM-B8 - Small Group Communication	3
	ENGL-B1A - Expository Composition	3
	INDR-B12 - Intro to Drafting and CAD	3
	MATH-B6A - Analytic Geometry/Calculus I	4
	POLS-B1 - Amer Government/NatlStLocal	3
Spring 2022 16 Units	ART-B4 - Two Dimensional Design	3
	COMM-B5 - Argumentation and Debate	3
	CRPS-B5 - Plant Science	3
	ELET-B4 - Computer Integrated Manuftrng	3
	PHYS-B2A - General Physics-Mec and Heat	4

2021-22 Total Units: 32

Summer 2022	<i>No courses scheduled</i>	
0 Units		
Fall 2022 15 Units	ECON-B1 - Principles of Economics-Micro	3
	ELET-B55A - Electric Motors - Controls	3
	ELET-B58 - Adv Programmble Logic Contrllrs	3
	PSYC-B1A - General Psychology	3
	Placeholder Elective: Select at least three units from the following	3
Spring 2023 13 Units	ELET-B56 - Instrumentatn/Process Control	3
	ELET-B61 - Telecommunications	3
	PHIL-B10 - Introduction to Ethics	3
	SPAN-B1 - Elementary Spanish I	4

2022-23 Total Units: 28

Summer 2023	<i>No courses scheduled</i>	
0 Units		

Term	Course Information	Units
Fall 2023	ENGL-B100 - Technical Writing	3
15 Units	INDA-B100 - Industrial Design Graphics I	3
	INDA-B110 - Industrial Automation Networks	3
	INDA-B114 - Indt. Safety Principles & Mgmt	3
	INDA-B125 - Oper Mgmt in Automation Field	3
	Spring 2024	INDA-B105 - Materials Science for the Tech
15 Units	INDA-B120 - Indr Automation System-Robotic	3
	INDA-B135 - Economic Decision Making	3
	INDA-B140 - Quality Management	3
	INDA-B143 - Material & Maintenance Mgmt	3

2023-24 Total Units: 30

Summer 2024	<i>No courses scheduled</i>	
0 Units		
Fall 2024	INDA-B122 - Appld Method Motion Proc Cntr	3
9 Units	INDA-B132 - Project Management	3
	PSYC-B100 - Indt. & Organizational Psyc	3
Spring 2025	INDA-B144 - Leadership	3
9 Units	INDA-B150 - Sys Desigh & Intgrtn (Sr Proj)	3
	PHIL-B100 - Industry Ethics	3

2024-25 Total Units: 18

Industrial Automation BS for New Students Summary		CSU General Education Summary	
Completed:	6 Units	Completed:	6 Units
Currently Enrolled:	6 Units	Currently Enrolled:	6 Units
Required:	120 Units	Required:	60 Units

Plan Summary

Test Results:	HS Highest Math Course Comp: 2 , Multi-Measures English BC: 6 , BC Multiple Measures S: 4
Plan Created:	Jessica Garcia 9/09/2019
Plan Updated:	Cynthia Quintanilla 10/22/2019
Plan Approved:	Cynthia Quintanilla 10/22/2019

My Industrial Automation BS for New Students Plan

Industrial Automation BS for New Students

REQUIREMENTS



Student ID: #0000000000

Note: This program requires a 2.0 minimum grade for courses used by its requirements unless otherwise specified.

CSU General Education Breadth Recommendations
These are recommended courses to satisfy all areas of the CSU GE Breadth.

COMM-B8 Small Group Communication	3 Units	Planned for Fall 2021
CSU GE Area A2 Written Communication (minimum grade 2.0)		
ENGL-B1A Expository Composition	3 Units	Planned for Fall 2021
COMM-B5 Argumentation and Debate	3 Units	Planned for Spring 2022
Physical Science with Lab (CSU GE Area B1 and B3) PHYS B2A or PHYS B4A or equivalent course at a regionally accredited Institution. (minimum grade 2.0)		
PHYS-B2A General Physics-Mec and Heat	4 Units	Planned for Spring 2022
CRPS-B5 Plant Science	3 Units	Planned for Spring 2022
Quantitative Reasoning (CSU GE Area B4) MATH B1B or B6A or equivalent course at another regionally accredited institution. (minimum grade 2.0)		
MATH-B6A Analytic Geometry/Calculus I	4 Units	Planned for Fall 2021
ART-B4 Two Dimensional Design	3 Units	Planned for Spring 2022
PHIL-B10 Introduction to Ethics	3 Units	Planned for Spring 2023
SPAN-B1 Elementary Spanish I	4 Units	Planned for Spring 2023
Social Science (CSU GE Area D) (minimum grade 1.0)		
ECON-B1 Principles of Economics-Micro	3 Units	Planned for Fall 2022
Social Science (CSU GE Area D) (minimum grade 1.0)		
HIST-B17A History of the United States	3 Units	In progress, Fall 2019
POLS-B1 Amer Government/NatStLocal	3 Units	Planned for Fall 2021
PSYC-B1A General Psychology	3 Units	Planned for Fall 2022
Prerequisite Courses MATH B1B or higher and (PHYS B2A or PHYS B4A) are prerequisites for this program that must be completed with a grade of C or better.		
ELET-B1A Basic Electronics (DC)	3 Units	✓ Taken Fall 2018 (Grade: C)
ELET-B3 Programmable Logic Contrls	3 Units	In progress, Fall 2019
INDR-B12 Intro to Drafting and CAD	3 Units	Planned for Fall 2021

ELET-B1B Electronic Circuit (AC & Anlg)	3 Units	✓ Taken Spring 2019 (Grade: B)
ELET-B4 Computer Integrated Manuftrng	3 Units	Planned for Spring 2022
ELET-B58 Adv Progrmmble Logic Contrlrns	3 Units	Planned for Fall 2022
ELET-B55A Electric Motors - Controls	3 Units	Planned for Fall 2022
ELET-B56 Instrumentatn/Process Control	3 Units	Planned for Spring 2023
ELET-B61 Telecommunications	3 Units	Planned for Spring 2023
Technical Elective		
Elective: Select at least three units from the following		
Placeholder for Fall 2022	3 Units	
Program Requirements		
ENGL-B100 Technical Writing	3 Units	Planned for Fall 2023
INDA-B100 Industrial Design Graphics I	3 Units	Planned for Fall 2023
INDA-B105 Materials Science for the Tech	3 Units	Planned for Spring 2024
INDA-B110 Industrial Automation Networks	3 Units	Planned for Fall 2023
INDA-B114 Indt. Safety Principles & Mgmt	3 Units	Planned for Fall 2023
INDA-B120 Indr Automation System-Robotic	3 Units	Planned for Spring 2024
INDA-B122 Appld Method Motion Proc Cntr	3 Units	Planned for Fall 2024
INDA-B125 Oper Mgmt in Automation Field	3 Units	Planned for Fall 2023
INDA-B132 Project Management	3 Units	Planned for Fall 2024
INDA-B135 Economic Decision Making	3 Units	Planned for Spring 2024
INDA-B140 Quality Management	3 Units	Planned for Spring 2024
INDA-B143 Material & Maintenance Mgmt	3 Units	Planned for Spring 2024
INDA-B144 Leadership	3 Units	Planned for Spring 2025
INDA-B150 Sys Desigh & Intgrtn (Sr Proj)	3 Units	Planned for Spring 2025
PHIL-B100 Industry Ethics	3 Units	Planned for Spring 2025
PSYC-B100 Indt. & Organizational Psyc	3 Units	Planned for Fall 2024

My Industrial Automation BS for New Students Plan

CSU General Education

Student ID: #00

REQUIREMENTS

AREA A: English Language Communication and Critical Thinking

A.1. Oral Communication (3 units) (minimum grade 2.0)

COMM-B8 Small Group Communication	3 Units	Planned for Fall 2021
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A.2. Written Communication (3 units) (minimum grade 2.0)

ENGL-B1A Expository Composition	3 Units	Planned for Fall 2021
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A.3. Critical Thinking (3 units) (minimum grade 2.0)

COMM-B5 Argumentation and Debate	3 Units	Planned for Spring 2022
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AREA B: Scientific Inquiry and Quantitative Reasoning

B.1. Physical Sciences (1 course)

PHYS-B2A General Physics-Mec and Heat	4 Units	Planned for Spring 2022
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B.2. Life Sciences (1 course)

CRPS-B5 Plant Science	3 Units	Planned for Spring 2022
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B.3. Laboratory Activity

PHYS-B2A General Physics-Mec and Heat	4 Units	Planned for Spring 2022
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B.4. Mathematics/Quantitative Reasoning (1 course) (minimum grade 2.0)

MATH-B6A Analytic Geometry/Calculus I	4 Units	Planned for Fall 2021
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AREA C: Arts, Literature, Philosophy, and Foreign Language

C.1. Arts (1 course)

ART-B4 Two Dimensional Design	3 Units	Planned for Spring 2022
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C.2. Humanities (1 course)

SPAN-B1 Elementary Spanish I	4 Units	Planned for Spring 2023
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C.1 or C.2. Arts or Humanities (1 course)

PHIL-B10 Introduction to Ethics	3 Units	Planned for Spring 2023
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AREA D: Social and Behavioral Sciences

D.1 - D.10 Social and Behavioral Sciences (select 9 units from at least 2 disciplines)

HIST-B17A History of the United States	3 Units	In progress, Fall 2019
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POLS-B1 Amer Government/NatStLocal	3 Units	Planned for Fall 2021
ECON-B1 Principles of Economics-Micro	3 Units	Planned for Fall 2022
AREA E: Lifelong Learning and Self-Development		
Area E. Lifelong Learning and Self-Development (3 units)		
PSYC-B1A General Psychology	3 Units	Planned for Fall 2022
Total CSU Transferable Units		
60 Total CSU Transferable Units		
18 courses ART-B4 (3 Units), COMM-B5 (3 Units), COMM-B8 (3 Units), CRPS-B5 (3 Units), ECON-B1 (3 Units), ELET-B1A (3 Units), ELET-B1B (3 Units), ELET-B3 (3 Units), ELET-B4 (3 Units), ENGL-B1A (3 Units), HIST-B17A (3 Units), INDR-B12 (3 Units), MATH-B6A (4 Units), PHIL-B10 (3 Units), PHYS-B2A (4 Units), POLS-B1 (3 Units), PSYC-B1A (3 Units), SPAN-B1 (4 Units)	57 Units	
1 placeholder that also meet other requirements	3.00 Units	
Math and English Prerequisites		
ENGL-B50 Intro to College Composition	4 Units	
MATH B65 or MATH B70 ^a		

a.STEM, Business, or Elementary Teacher Education should NOT take MATH B65.