

2015

Bakersfield College Substantive Change Proposal

*Proposal to Offer New Bachelor of Science Degree in
Industrial Automation (BSIA)*

Bakersfield College
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Accrediting Commission for Community and Junior Colleges
Western Association for Schools and Colleges

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The BSIA Team



The Bachelor of Science in Industrial Automation Degree Program was developed by a team of faculty and administrators who spent numerous hours collaborating and envisioning a successful program for our Bakersfield College students and our local community. Led by our President, Sonya Christian, the team focused on crafting a detailed plan to meet workforce needs utilizing college and district resources efficiently.

The team consisted of:

Sonya Christian	President, Bakersfield College
Anthony Culpepper	Vice President, Finance and Administrative Services
Liz Rozell	Dean of Instruction
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Bakersfield College Substantive Change Proposal

Baccalaureate Degree in Industrial Automation

A. A concise description of the change and request to add a baccalaureate program

Bakersfield College is proposing an upper division program in Industrial Automation to complement our existing robust lower division electronics technology program, resulting in a Bachelor of Science Degree in Industrial Automation (BSIA), approved by the Board of Governors baccalaureate degree pilot program for California Community Colleges.

The current Electronics Technology Program provides certificate and degree options which prepares technicians in the areas of instrumentation, automation, process control and telecommunications. These include four job skills certificate options (Manufacturing Automation, Industrial Maintenance, Industrial Automation, and Industrial Communications); an Electronics Certificate of Achievement; and an Electronics Technology A.S. degree. Building upon this foundation of technical training, the upper division coursework in Industrial Automation will help in filling the employment gap between the technician and engineer by preparing individuals to be employed in technology positions that require project management skills but not the extensive design skills of engineers.

This new program will begin in Fall 2016 and includes 41 lower division and 9 upper division General Education units, 19 required lower division units in Electronics Technology, and 51 upper division units in Industrial Automation, totaling 120 units. Thus, the following changes to curriculum will be implemented:

- 1) Addition of 17 new technical upper division courses in the Industrial Automation discipline.
- 2) Addition of 3 new general education upper division courses in the following discipline areas: English (Technical Writing), Psychology (Psychology of Industrial Organizations), and Philosophy (Industrial Ethics).

All existing Accrediting Commission for Community and Junior Colleges (ACCJC) Eligibility Requirements, Standards, and Policies will be met, including new requirements regarding the Bachelor degree.

A.1. Evidence that the field of study for the degree is consistent with the institutional mission

The Mission Statement was revised in 2015 to reflect Bakersfield College's participation in the pilot program to offer a Bachelor of Science Degree in Industrial Automation. It had been previously revised in 2014 to reflect the updated Institutional Learning Outcomes and in response to the 2014 ACCJC Standards. The Kern Community College District Board of Trustees adopted the newly revised

Mission Statement on May 15, 2015. (1)

Bakersfield College Mission Statement:

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. (2)

The new Bachelor of Science degree program in Industrial Automation fulfills the college mission as illustrated in the program mission statement established by the discipline faculty and listed below.

Industrial Automation Baccalaureate Program Mission Statement:

The Baccalaureate Program in Industrial Automation is designed to prepare individuals for technical management careers in industries which utilize automation, including the petroleum, manufacturing, logistics and agriculture industry sectors, in order to improve the regional economy.

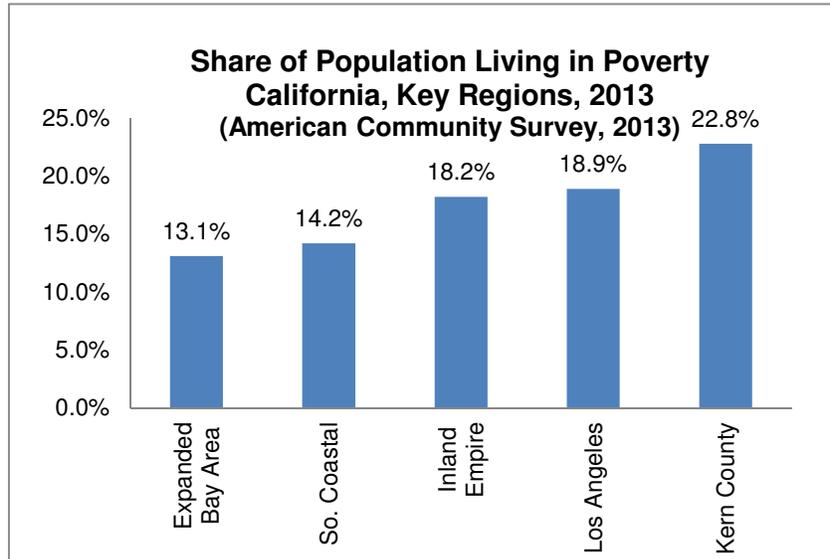
A.2. Rationale for change

Bakersfield College (BC), founded in 1913, is the largest of three colleges in the Kern Community College District (KCCD). Geographically, KCCD, one of the biggest community college districts in the United States, covers nearly 25,000 square miles, spanning the bulk of California's southern San Joaquin Valley. This area is primarily a rural region whose employment is powered by agriculture, oil and gas, and manufacturing and logistics industries. In the past ten years, the region's population has grown 16% to about 2.27 million people. The communities offer expanding economies coupled with high poverty and unemployment, representing some of the highest such rates in California. Educational opportunity in this rural frontier, then, is paramount, and Bakersfield College has historically served much of the rural communities' educational needs with excellence.

Today, more than 20,000 students annually enroll in classes at Bakersfield College on its Panorama Drive campus, as well as taking classes in its centers in downtown Bakersfield and the rural community of Delano, 40 miles north on the Kern/Tulare County line. BC's satellite sites also provide classes in other rural communities such as Wasco, McFarland and Arvin as well as a robust online enrollment. BC's students represent the distinct and diverse microcosm of California's central valley. Bakersfield College is a federally designated Hispanic Serving Institution (HSI). Nearly two-thirds of its students count on financial aid to help them achieve their educational attainment goals. Vocational students represent the largest number of

successful course completers at BC, with more than 77% of vocational students completing courses with a grade C or better.

US Census data indicates that Kern County, the county in which Bakersfield College is located, is ranked 35th out of 58 counties among populations having a constituency of ages 25 years and over. Of the 503,688 constituents that are classified within that population, only 15.3% have bachelor's degrees compared to the national average of 20%. Further, using poverty level as a measure, Kern County ranks below the United States average as well as the California average when comparing Baccalaureate attainment and those



individuals classified below the poverty level, registering at a 0.7% rate. In addition, Hispanic/Latino Baccalaureate attainment also ranks below the United States and California averages at 5.1%. The only public four year university in the county is California State University, Bakersfield (CSUB). Established in 1970, CSUB serves 8,520 students with over 50 different Bachelor's and Master's degree programs but not industrial automation.

The current Electronics Technology program, which is the foundation of the BSIA degree program, provides four job skills certificate options to students (Manufacturing Automation, Industrial Maintenance, Industrial Automation, and Industrial Communications); an Electronics Certificate of Achievement; and an Electronics Technology A.S. degree. There are eleven courses within the Electronics Technology program that comprise the curricular requirements of these certificates and degrees.

In 2014-2015 the Electronics Technology program enrolled 359 students, a 32% increase from the previous year. The Engineering and Industrial Technology Department offered 32 sections of Electronics with 87% retention and 72% success rates. There were 62 certificates and degrees awarded during this academic year, including 23 certificates in automation.

Currently, BC has a large pipeline of students interested in applying for the Bachelor of Science in Industrial Automation Degree. Students who have completed certificates and/or A.S. degrees in Electronics Technology and are working in

industry report they are denied promotional opportunities due to the lack of a technical B.S. degree similar to the BSIA.

This new program will allow opportunities within our community for students to obtain a baccalaureate degree in a technical discipline for an estimated tuition cost of \$10,000.

B. A description of the new program to be offered; level and rigor of upper division courses commonly accepted as appropriate to the baccalaureate degree; program length; identification of delivery mode for the courses

Industrial automation represents the technology-driven business model of the 21st century. In today's industry, an engineering team is involved in developing new products or systems. This team is typically composed of engineers, technologists and technicians. Engineers apply their knowledge of mathematics and science to develop ways to economically utilize natural resources for the benefit of mankind through a wide spectrum of activities including the conception, design, development and formulation of new systems and products. Technologists are typically graduates of baccalaureate-level programs that emphasize the *application* of scientific and technical knowledge; they participate in activities surrounding applied design, manufacturing, product assurance, sales and project management. Technicians work with equipment, assembling, repairing and testing devices or systems based on technical skills rather than scientific knowledge used in the original design.

Bakersfield College offers a very comprehensive and rigorous curriculum for technician training within the Electronics Technology program, which includes the foundation coursework for Industrial Automation. Likewise, the local California State University, Bakersfield (CSUB), has developed a robust electrical engineering program that addresses the industry need for engineers. The employment gap in our service area exists with the lack of affordable education and training for the technologist with project management skills. Bakersfield College will offer a baccalaureate degree in Industrial Automation that targets occupations designed for the skill set of the technologist described above.

The Bachelor of Science degree in Industrial Automation focuses on the application of electronics and computer technology to industrial automation systems, including instrumentation and control, industrial robotics, and process control systems. The program prepares students for careers in the design, operation, and management of industrial automation systems focusing on the local industries that utilize these technologies, such as petroleum production, food production, fabrication, and logistics. Significant emphasis is placed on project based learning facilitated by significant laboratory work.

This degree requires nine units of upper division GE coursework enabling students to meet the Program Learning Outcomes (PLOs). In collaboration with CSUB, the BC program faculty determined that the upper division general education coursework

would include technical writing, professional ethics, and organizational psychology. The structure of these courses includes elements of diversity, intercultural knowledge, and civic learning necessary to address “real-world” problems.

A detailed semester-by-semester educational plan has been developed for incoming freshmen, sophomores, juniors and seniors. The required lower division curriculum consists of 60 units which includes the California State University General Education Breadth and six technical core courses. For the incoming college prepared full time freshmen student, the lower division coursework can be completed in two years. The sixty units of upper division coursework can also be completed in two years and includes 9 units of upper division general education and 51 units of technical courses.

Pedagogical goals of the program faculty include the modularization of the curriculum and expansion of active learning by providing increased sections of hybrid courses in which lecture material is provided online and labs are conducted face-to-face. These particular pedagogies will be integrated in much of the upper division coursework offered for the baccalaureate, providing accessibility to the program for workers who wish to advance in their current companies. Current curriculum development includes diverse delivery modes and a significant amount of project based learning facilitated by a strong lab component as shown in the table below.

Delivery Mode	Percentage of Upper Division Student Contact
Hybrid OR Face to Face	60%
Online	7%
Face to Face only	33%

Project Based Learning	Percentage of Upper Division Student Contact
Lecture	52%
Lab	48%

Complete details of the proposed curriculum are outlined in Figure 1 on the next page.

Figure 1

Proposed Industrial Automation Baccalaureate Degree Curriculum

Lower Division Curriculum

CSU GE Breadth	Units
A.1 Oral Communication	3
A.2 Written Communication (ENGL B1a)	3
A.3 Critical Thinking	3
B.1 Physical Universe (Physics B2a or higher required - satisfies B.3 Lab requirement) ¹	4
B.2 Life Science	3
B.3 Laboratory Activity	
B.2 Mathematics/Quantitative Reasoning (Math B1a required) ²	4
C. Arts and Humanities	9
D. Social Sciences	9
E. Lifelong Learning and Self-Development	3
Total	41

Lower Division Technical Core	Units
ELET B1 (Basic Electronics)	4
ELET B4 (Computer Integrated Manufacturing)	3
ELET B5 (Programmable Logic Controllers)	3
ELET B55a (Electric Motors - Controls)	3
ELET B56 (Instrumentation and Process Control)	3
ELET B70 (Mechanical Systems)	3
Total	19

¹Or Physics B4a or higher

²Or Math B2, Math B6a or higher

Total Lower Division GE	41
Total Lower Division Technical	19
Total Upper Division Technical	51
Total Upper Division GE	9

Total Units 120

Upper Division Curriculum

Upper Division General Education	Units
Technical Writing	3
Industrial Organizational Psychology	3
Industrial Ethics	3
Total	9

Upper Division Technical Core	Units
INDA B100 (Industrial Safety Principles and Management)	3
INDA B100a (Industrial Design Graphics I)	3
INDA B100b (Industrial Design Graphics II)	3
INDA B110 (Materials Science for the Technician)	3
INDA B110 (IA Networks)	3
INDA B112 (IA Systems)	3
INDA B114 (IA Measurement)	3
INDA B116 (Industrial Motion Control)	3
INDA B120 (Industry Sector Seminar: Applied Automation)	3
INDA B122 (Industry Sector Seminar: Manufacturing and Production)	3
INDA B124 (Industrial Manufacturing Processes)	3
INDA B130 (Project Management and Budgeting)	3
INDA B132 (Leadership and Entrepreneurship)	3
INDA B134 (Quality Assurance)	3
INDA B135 (Facilities Planning and Operations)	3
INDA B140 (Systems Design and Integration)	3
INDA B141 (Systems Implementation)	3
Total	51

C. Description of the planning process which led to the request for the change

Early in the SB850 discussions, Bakersfield College eagerly embraced the possibility of California Community Colleges offering baccalaureate degrees and participated in statewide discussions promoting this opportunity. The BC Dean of Allied Health/Nursing and the College President actively participated in efforts supporting

SB850. In February, 2014 President Sonya Christian submitted a letter of support for SB850 legislation. (3) Subsequently, during spring 2014, the Bakersfield College Academic Senate and College Council began discussions of support for the Baccalaureate Degree Program. (4, 5) Later that year, in August 2014, KCCD Chancellor Sandra Serrano provided a letter of support for the SB850 legislation and potential participation by the Kern Community College District. (6)

In anticipation of successful passage of SB850, the college prepared three proposals for baccalaureate degrees, ranked in tiers. With the elimination of the possibility of offering a baccalaureate program in Nursing, President Christian chose to pursue submission of the proposal for a Bachelor of Science Degree in Industrial Automation based on the workforce need, program readiness, and budgetary considerations.

During the fall semester of 2014, specifics of the Industrial Automation proposal was presented to College Council, Accreditation and Institutional Quality Committee, Faculty Chair and Directors Committee, Academic Senate, Curriculum Committee, and Program Review Committee, culminating in a presentation to the Kern Community College District Board of Trustees on November 13, 2014. (7)

Numerous industry leaders sent statements of support including Aera Energy, A- C Electric, Kern Steel Fabrication, Dignity Health, Chevron and Paramount Farms. The local industrial automation community strongly backed BC's plan through the local Central Section of the International Society for Automation. Industry and economic growth organizations such as the Greater Bakersfield Chamber of Commerce and Kern Economic Development Corporation support Bakersfield College's BS degree because it will also encourage new businesses to open operations in the region. Educators including the Kern County Superintendent of Schools and area high school Delano Chamber of Commerce, California Senators Fuller and Vidak, and U. S. Congressmen Kevin McCarthy and David Valadao, among others. We developed a dedicated webpage with statements of support from over 70 organizations. (8)

Upon full vetting by the college campus and the KCCD Board of Trustees and Chancellor, the program was submitted to the state for consideration as part of the pilot program. Bakersfield College was selected by a state review committee, receiving initial approval by the Board of Governors January 20, 2015 and final approval on March 15, 2015. (9, 10, 11)

During the initial 2014 planning stages, faculty met to develop the mission for the degree program and a set of Program Learning Outcomes (PLOs) that align with our Institutional Learning Outcomes. To meet these PLOs, faculty in the Engineering and Industrial Technology Department crafted curriculum rich in advanced technical skills and GE breadth to prepare students with deep technical skills as well as critical thinking and communication for employment in various local and regional industries. They identified and developed course descriptions for 17 three-unit upper division technical courses focused on applied hands-on learning. The faculty used the Automation Competency Model developed through the US Department of Labor Employment and

Training Administration and the Automation Federation to determine the specific coursework that would meet the PLOs. Thirteen of the courses have a lab component and 53% of the student contact hours in the upper division coursework are spent in lab. These classes not only have the extensive research and writing components found in upper division coursework but also include realistic, scenario-based projects that apply the concepts learned, while developing the skills of planning/designing, resource management, teamwork, creative thinking, and working within the parameters and limitations specific to the industries in which students may be employed upon completion.

Program Learning Outcomes for the Bachelor of Science in Industrial Automation Degree Program were developed and aligned with the Institutional Learning Outcomes.

Institutional Learning Outcomes	Programming Learning Outcomes
<p>1. Think. Think critically and evaluate sources and information for validity and usefulness.</p>	<p>Upon completion of this program, a student will be able to:</p> <ul style="list-style-type: none"> - Apply critical and analytical thinking skills to industry related problems, related to safety, quality assurance and design of systems.
<p>2. Communicate. Communicate effectively in both written and oral forms.</p>	<p>Upon completion of this program, a student will be able to:</p> <ul style="list-style-type: none"> - Display effective communication skills, including presentation and technical writing skills.
<p>3. Demonstrate. Demonstrate competency in a field of knowledge or with job-related skills.</p>	<p>Upon completion of this program, a student will be able to:</p> <ul style="list-style-type: none"> - Demonstrate a broad understanding of the mathematical and scientific principles utilized in industrial automation and manufacturing. - Demonstrate competency in industrial automation and instrumentation, including relevant hardware and software utilized in industry.
<p>4. Engage. Engage productively in all levels of society—interpersonal, community, the state and nation, and the world.</p>	<p>Upon completion of this program, a student will be able to:</p> <ul style="list-style-type: none"> - Manage automation and manufacturing projects applying knowledge of budgetary and scheduling principles in an ethical environment.

In October, 2014 the Industrial Automation Baccalaureate proposal was presented to the Electronics Technology Advisory Committee. As a result, Blair Pruett of Kern Steel Fabrication began the development process for the advisory committee for the Industrial Automation program. Currently, there are 24 industry committee members representing a wide range of industries - Chevron North America, Linn Energy, Tel-Tech Security and TJ Cross Engineers. The first meeting was held on June 19, 2015 (12) in

which curriculum was discussed and bylaws were approved. This committee, chaired by Blair Pruett, will offer expertise and advice in key programmatic areas related to current business trends and needs.

The Bakersfield College institutional planning process is strategic and includes an annual planning process that addresses student and community needs, labor market trends, and results in an Educational Master Plan (13) and Strategic Directions document (14). The process includes a review of data, assessment of student learning outcomes, and facilities needs which are components of the program review process (15).



In addition, Career and Technical Education (CTE) Programs are reviewed every two years. Employment trends and data for the region are assessed as a part of the review process. This deliberate, ongoing, approach to reviewing all programs and services focuses on the mission of the College and takes into account demands of students, employers, universities, and college resources.

Planning Process Timeline for the Bachelor of Science in Industrial Automation

February 1, 2014	President Sonya Christian letter to Chancellor Brice Harris supporting baccalaureate degrees at California Community Colleges. (3)
February 28, 2014	BC Academic Senate discusses support of baccalaureate degrees at California Community Colleges. (5)
March 3, 2014	BC College Council discusses baccalaureate degrees at California Community Colleges. (4)
May 8, 2014	KCCCD Board of Trustees vote to approve resolution to support SB850. (16, 17)
August 22, 2014	Chancellor Sandra Serrano letter supporting baccalaureate degrees at California Community Colleges. (6)
Fall, 2014	Industrial Automation program presentations to College Council, Accreditation and Institutional Quality, Faculty Chair and Directors Committee, Academic Senate, Curriculum Committee, and Program Review Committee. (4, 5)
September 28, 2014	Bakersfield College Academic Senate Resolution to Support Bakersfield College as a Pilot Location for Community College Applied Baccalaureate Degree Program (18)
October 29, 2014	Industrial Automation program presentation to the Electronics Technology Advisory Committee.

November 13, 2014	Industrial Automation program presentation to the Kern Community College District Board of Trustees. (7)
December 19, 2014	Bakersfield College proposal to participate in the pilot program offering a Bachelor of Science degree in Industrial Automation submitted to the California Community College Chancellors Office. (19)
January 20, 2015	Bakersfield College selected as a participating college in the Baccalaureate pilot program. (9, 10)
March 16, 2015	Board of Governors approves Bakersfield College as one of 12 community colleges to participate in the Baccalaureate degree pilot program, offering a Bachelor of Science Degree in Industrial Automation. (11)
April, 2015 to September, 2015	Curriculum development of upper division Course Outlines of Record.
May 15, 2015	KCCD Board of Trustees approval of college catalog outlining the Baccalaureate Degree Program. (20)
June 19, 2015	First meeting of Bachelor of Science in Industrial Automation Advisory Board. (12)
September, 2015	Submit junior level Industrial Automation courses to the BC Curriculum Committee for campus approval.
October, 2015	Submit senior level Industrial Automation and upper division general education courses along with the program to the BC Curriculum Committee for campus approval.
2015-2016	<ul style="list-style-type: none"> • Complete curriculum development (instructional lecture and lab materials) for junior level courses. • Develop program application process. • Host program information meetings for potential applicants.
2016-2017	<ul style="list-style-type: none"> • Admit first BSIA pilot program class, graduation 2018 • Complete curriculum development (instructional lecture and lab materials) for senior level courses.
2017-2018	Admit the second BSIA pilot program class, graduation 2019
2018-2019	Admit the third BSIA pilot program class, graduation 2020
2019-2020	Admit the fourth BSIA pilot program class, graduation 2021
2020-2021	Admit the fifth BSIA pilot program class, graduation 2022
2021-2022	Admit the second BSIA pilot program class, graduation 2023
2022-2023	<ul style="list-style-type: none"> • Graduation for last BSIA pilot program class • Baccalaureate pilot program ends June 30, 2023 • Pilot program final report due August 31, 2023
Ongoing	<ul style="list-style-type: none"> • Pilot program reporting • BSIA Advisory Board Meetings • Program Review • Data collection and evaluation • Assessment of SLOs and PLOs

D. Evidence that the institution has analyzed, has the capacity, and has provided for adequate human, administrative, financial, and physical resources and processes necessary to initiate, maintain, and monitor the baccalaureate program and to assure that the activities undertaken are accomplished with acceptable quality

Bakersfield College is accredited by the Accrediting Commission for Community and Junior Colleges (ACCJC) of the Western Association of Schools and Colleges (WASC). BC accreditation was reaffirmed in 2012 and by a follow-up visit in 2013. **There were no recommendations** from the follow-up visit. The College received a commendation on community connections:

The Team commends the College President for her enthusiasm, community spirit and speed in which she was able to bring the vast range of college services and educational programs into the conversations with local community and business leaders. As reported by one Chief Executive Officer of a local business organization, the College is now an important resource that is available to the community because the College President has taken the time to bring that message and those resources into the Bakersfield community

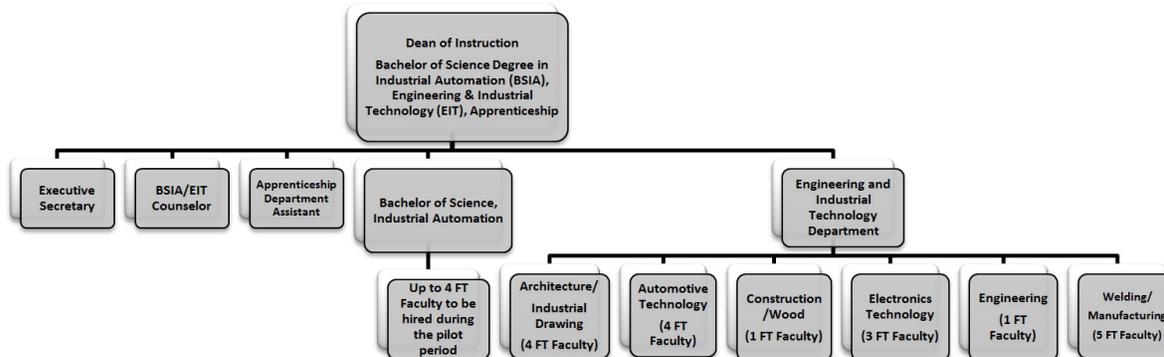
The latest auditor’s opinion, Matson and Isom (21), concerning the fiscal management and sustainability of KCCD states:

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the business-type activities of the District, as of June 30, 2014; the changes in financial position; and cash flows thereof, for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Program administration is organized in four categories:

<p>Budget oversight and fiscal sustainability will be provided by the Vice President of Finance and Administrative Services, a licensed CPA, CMA, CFM, and EA, along with the Dean of Instruction assigned to monitor the program.</p>
<p>Long term sustainability and responsiveness to work force need of the region will be provided by the President, who was a long time math faculty at BC, and has demonstrated a commitment to the College and to the community. In addition the current dean, who was a long time faculty member in math and Engineering and has strong ties to industry, has an exemplary reputation that garners significant confidence from internal and external communities.</p>
<p>State-of-the art curriculum, current instructional technologies and response to industry needs will be provided by the department chair and faculty, working closely with the Industrial Automation Advisory Committee, who have the necessary degrees and experience to provide this leadership.</p>
<p>Student success and support provided by a dedicated counselor working with students in the program ensuring graduation in 4 years with the Bachelor of Science degree.</p>

In anticipation of the Fall, 2016 start date of the BSIA program, the college implemented an administrative reorganization. One outcome was the reassignment of the Dean of STEM to the Dean of the BSIA, Department of Engineering and Industrial Technology, and the Apprenticeship program as shown in the organizational chart shown below. Subsequently, another Dean of Instruction was hired to supervise STEM.



A full-time faculty and full-time counselor positions, in addition to an executive secretary, are approved and are currently in the interview/hiring process.

Over the last several years, STEM and CTE programs have utilized keen business and funding models to advance student success by leveraging private philanthropy, federal grant monies, and general funds. A detailed projected budget for the eight years of the pilot program was developed and covers start-up costs and ongoing costs. The initial capital outlay of \$900,000.00, spread over the first two years, covers lab renovation and equipment purchases. Grant funding sources and donations secured to date of \$300,000 help to offset these costs. An annual budget for the balance of capital outlay costs and operating expenditures was developed and is financed by the general fund of the college.

Bakersfield College already has in place a number of state-of-the-art facilities that were equipped through grant funding, institutional investment, industry financial and in-kind donations, and financial support through local industry. All Electronics and Automation facilities have sufficient computers, software, and information technology resources.

Current facilities include: two fully-equipped Electronics lab rooms, containing test and instructional equipment that was purchased or built within the last ten years, including motors and controls workstations and equipment, instrumentation and process control equipment, pneumatics, fluid power, mechanical systems, industrial control, radio and telecommunications training equipment, instructor-created training equipment developed through industry collaboration; a fully-equipped Computer Integrated Manufacturing lab, containing Programmable Controller workstations, interfaced equipment to control and monitor, automation training modules, two functional Computer Integrated Manufacturing “cells” that include materials handling, automated storage and retrieval, supervisory control, and vision inspection systems; two fully-equipped Industrial Drawing labs with current technology: AutoCAD and SolidWorks; and an Engineering Testing Lab equipped for materials science labs.

Additional facilities that will provide resources and equipment for coursework and projects include: a manufacturing lab with computer numerical controlled lathes and milling machines for project fabrication, welding and woodworking labs for fabrication, and a “design center” with laser cutting and rapid prototyping capabilities.

Space has been identified for renovation to an additional automation lab equipped with the industrial robotics necessary for the senior level courses. Planning monies have been earmarked in the general fund for designing the lab space and renovation will begin in FY 2016-2017. This should provide sufficient lab space to support the program.

E. Evidence that:

E.1. The institution has received all necessary internal and/or external approvals

- ✓ Bakersfield College has a dedicated webpage with statements of support from over 70 organizations including industry partners, non-profit organizations, affinity groups, government entities and legislators. (8)
- ✓ Academic Senate Resolution (15)
- ✓ KCCD Board of Trustee Minutes, May 15, 2015 (20)

E.2. Verification the institution is authorized by its state/government to offer the proposed baccalaureate degree

- ✓ Approved by the Board of Governors on March 16, 2015 (11)

E.3. There is sufficient demand for the program within the area served by the college

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. According to Economic Modeling Specialists International (EMSI) data, these types of positions in Kern County have grown over 11% since 2009 and are predicted to grow an additional 20% over the next 9 years.

Students receiving the Bachelor of Science in Industrial Automation degree at BC are qualified for managerial track occupations which require technical training in the automation field, as well as project management, systems implementation, sales, quality control, and manufacturing operations. There are over 4400 jobs in the Bakersfield service area for which BSIA graduates would be qualified, with expected annual openings of 200 and median earnings of \$47/hour (EMSI, 19).

According to local industry leaders, there is a shortage of qualified technical mid-management workforce in Kern County. This is supported by Occupational Employment Statistics (OES) findings in which there is a projected 12.4% increase in demand for general and operations managers from 2012-2022. Many companies hire from out-of-state with poor retention rates. Members from the newly established Industrial Automation Advisory Board stated that:

It is extremely evident that there is a need for a technically well trained mid management workforce; a workforce that can implement engineering designs and manipulate advanced technology to benefit various manufacturing processes while seamlessly communicating the technology processes to the team. We support Bakersfield College's BAS degree program due to the extreme need for employees with these advanced skills.

F. Evidence that each Eligibility Requirement will still be fulfilled, specifically related to the change

Bakersfield College reviewed the Eligibility Requirements as part of the Midterm Report process and again for the Substantive Change required when it became a pilot college for the Bachelor of Science degree program.

Eligibility Requirements (2014 Standards with 2002 cross-references)

1. Authority

Bakersfield College is authorized to operate as a degree granting institution by all appropriate governmental organizations and agencies as required by each of the jurisdictions in which it operates. Bakersfield College is accredited by the Accrediting Commission for Community and Junior Colleges of the Western Association of Schools and Colleges and is part of the California Community College system.

2. Operational Status (2002 Standards #6)

Approximately 19,000 students enroll each semester, primarily pursuing two-year degrees, transfer status, or certificates of achievement.

3. Degrees (2002 #7)

A substantial portion of Bakersfield College's educational offerings lead to associate degrees and certificate programs in both collegiate and occupational areas. A majority of students are enrolled in these courses and programs. Bakersfield College offers over 20 degree programs that are of two academic years in length. It has also been approved to offer the Bachelor of Science degree in Industrial Automation.

4. Chief Executive Officer

Bakersfield College has a Chief Executive Officer appointed by the Kern Community College District Board of Trustees. The CEO has full-time responsibility for the institution, administers board policies, delegates responsibility and authority as necessary, and communicates institutional information to internal and external

constituencies. The CEO is intimately engaged with the development of the BSIA program.

5. Financial Accountability (2002 #18)

Bakersfield College is audited through the Kern Community College District's annual financial audit process by an external independent auditor, Matson and Isom. Audit reports are posted on the District website for public review.

6. Mission (2002 #2)

The Mission Statement was revised in 2015 to reflect Bakersfield College's participation in the pilot program to offer a Bachelor of Science Degree in Industrial Automation. It had been previously revised in 2014 to reflect the updated Institutional Learning Outcomes and in response to the 2014 ACCJC Standards. The Kern Community College District Board of Trustees adopted the newly revised Mission Statement on May 7, 2015. The College publishes the Mission Statement in a variety of college documents, including the catalog, and posts it on the Panorama and Delano campuses and on the college website.

7. Governing Board (2002 #3)

Bakersfield College is governed by the seven-member Kern Community College District Board of Trustees, which is responsible for guaranteeing the academic quality, integrity, and financial stability of the College and District in order for them to achieve their missions. The Board is independent, derives its authority from the community, and remains accountable to the community. The Board adheres to its Conflict of Interest Statement and Statement of Ethics.

8. Administrative Capacity (2002 #5)

Bakersfield College has sufficient staff with appropriate preparation and experience to provide the administrative services necessary to support its mission and purpose, including the full support of the Bachelor of Science degree.

9. Educational Programs (2002 #8)

Bakersfield College's principal degree programs, including the Bachelor of Science, are aligned with its mission, are based on recognized fields of study, are of sufficient content and length, and maintain appropriate levels of quality and rigor for the degrees and programs offered. All programs have defined learning outcomes.

10. Academic Credit (2002 #9)

Bakersfield College awards academic credit based on accepted practices in higher education and in compliance with the California Code of Regulations.

11. Student Learning and Student Achievement (2002 #10)

Through development and publishing of its Institutional Scorecard, Bakersfield College has defined its standards and continues to assess its performance. Program Learning Outcomes are identified in the catalog and in public access to CurricUNET. Through the program review process, each program analyzes data trends, including success and

retention data and comparative rates for students taking face-to-face and online courses. The analysis of assessment outcomes and trend data informs program planning and resource requests.

12. General Education (2002 #11)

The Bakersfield College Catalog 2014-15 lists the general education requirements for an Associate Degree (pages 49-53). Every degree requires a minimum number of units of general education in the following five subject areas: Communication in the English Language; the Physical Universe and Its Life Forms; Arts, Foreign Language, Literature and Philosophy; Social, Political, and Economic Institutions; Lifelong Understanding; and Self-Development. In addition to demonstrating competence in writing and computational skills, the student who successfully completes these requirements will have had an introduction to the major areas of knowledge. Bakersfield College also requires students to take courses that are inclusive of multicultural perspectives found in American and global society. The quality and rigor of these courses is consistent with the academic standards appropriate to higher education.

13. Academic Freedom (2002 #12)

Bakersfield College provides an open educational environment where students and faculty are free to examine and test all knowledge appropriate to their discipline or area of major study as judged by the academic/education community in general. Academic Freedom policies are defined in Board Policies 4.B.11.c and 4.B.12 and in Article 4.A of the Faculty Contract (Article 4.A).

14. Faculty (2002 #13)

Bakersfield College employs 245 full-time and 261 adjunct faculty (Fall 2014). All faculty meet the minimum qualifications as defined by the California State Chancellor's Office. The Faculty Contract includes specific references to curriculum development and review (Article 4.C.17.f.) and assessment of learning (Article 6.C.2.a). Additional faculty are being hired to support the Bachelor of Science degree program. Faculty work closely with industry partners through a formal Advisory Board, receiving curricular input and feedback to align SLOs and PLOs to industry workforce expectations.

15. Student Support Services (2002 #14)

Bakersfield College provides a wide range of student services that support student learning and development within the context of its mission. The college is in the process of hiring a full time counselor devoted to the BSIA program. A task force including this counselor, program faculty, Dean of Student Success, Admissions and Records Director, and the Dean of Instruction responsible for the program are developing application and admissions processes. Tutoring and supplemental instruction will be a challenge because the BSIA is a unique program with no local higher education programs providing experienced graduates who may offer tutoring assistance. However, member of the BSIA Advisory Board have expressed a commitment to serving as mentors to the students enrolled in the program.

16. Admissions (2002 #15)

Bakersfield College has adopted and adheres to admission policies consistent with the Bakersfield College mission.

17. Information and Learning Support Services (2002 #16)

Bakersfield College provides sufficient information and learning support services to its students in support of its mission and all educational programs including those offered in a distance education modality and the Bachelor of Science degree program. This year the college hired a faculty member with the responsibility of supporting all faculty in the effective curricular integration of educational technology pedagogies.

18. Financial Resources (2002 #17)

Bakersfield College develops a schedule of classes for each instructional term designed to both provide appropriate learning opportunities for students and to ensure adequate financial resources by meeting enrollment targets established by the Kern Community College District. This leads to a budget allocation from the District from which the College develops an annual operating budget that adequately funds learning programs and services. The District has planned for and maintains adequate reserves both at the College and District level to assure financial stability.

19. Institutional Planning and Evaluation (2002 #19)

Bakersfield College evaluates its effectiveness in meeting its mission primarily through the program review process and through evaluations of its planning processes. It publishes these analyses on the Program Review Committee page, the Assessment Committee page, the CurricUNET SLO module (open to the public), and its institutional scorecard. The College shares its progress and work plans on the college and committee website. The president responds to the Program Review Annual Summary with a Closing the Loop document detailing how and why resources have been allocated.

20. Integrity in Communication with the Public

Bakersfield College publishes its catalog in both print and online, and its course schedule online. The following information can be located in the 2014-15 Bakersfield College Catalog (22):

General Information

- Official Name, Address(es), Telephone Number(s), and Website Address of the Institution (page 3)
- Educational Mission (2)
- Representation of accredited status with ACCJC and with programmatic accreditors, if any (page 5)
- Course, Program, and Degree Offerings (pages 57-226)
- Student Learning Outcomes for Programs and Degrees (pages 58-126)
- Academic Calendar and Program Length (page 5, pages 57-134)
- Academic Freedom Statement (page 36)
- Available Student Financial Aid (pages 30-31)

- Available Learning Resources (pages 28-34)
- Names and Degrees of Administrators and Faculty (pages 223-242)
- Names of Governing Board Members (page 6)

Requirements

- Admissions (pages 16-27)
- Student Fees and Other Financial Obligations (pages 25-26)
- Degree, Certificates, Graduation and Transfer (pages 52-72)

Major Policies Affecting Students

- Academic Regulations, including Academic Honesty (pages 36-37)
- Nondiscrimination (page 14)
- Acceptance and Transfer of Credits (page 38-39)
- Transcripts (page 27)
- Grievance and Complaint Procedures (page 14)
- Sexual Harassment (page 15)
- Refund of Fees (page 25)

21. Integrity in Relations with the Accrediting Commission

The Kern Community College District Board of Trustees provides assurance that Bakersfield College adheres to the eligibility requirements and accreditation standards and policies of the Commission, describes itself in identical terms to all its accrediting agencies, communicates any changes in its accredited status, and agrees to disclose information required by the Commission to carry out its accrediting responsibilities. This Midterm Report is submitted in light of our commitment to remain in compliance with the policies of the Commission.

G. Evidence that each Accreditation Standard will still be fulfilled specifically related to the change and that all relevant Commission policies are addressed

Bakersfield College is a fully accredited institution; its accreditation was reaffirmed without sanction in February 2013. The College has examined the 2014 ACCJC Accreditation Standards to ensure that the College will continue to fulfill them in its role as a pilot college offering the Bachelor of Science degree.

Accreditation Standards

Standard I: Mission, Academic Quality and Institutional Effectiveness, and Integrity

The Mission Statement was revised in 2015 to reflect Bakersfield College's participation in the pilot program to offer a Bachelor of Science Degree in Industrial Automation. It had been previously revised in 2014 to reflect the updated Institutional Learning Outcomes and in response to the 2014 ACCJC Standards. The Kern Community College District Board of Trustees adopted the newly revised Mission Statement on May 7, 2015. The mission statement guides the work of the College; it is the basis of the program

review process for every instructional, student services, and administrative service unit on campus. Each unit completes an Annual Update in the program review process and a Comprehensive Program Review every three years. All of the reviews are posted on the college website and an analysis provided to College Council. The Bachelor of Science degree will be participating in the 2015-16 program review cycle. In response to the program review process, the President prepares a Closing the Loop document to show how requests for personnel, facilities, technology, and budget are addressed through the resource allocation process. Instructional programs assess Student Learning Outcomes. All units regularly assess Program and Institutional Learning Outcomes.



Bakersfield College reviews its policies, processes, publications, and website regularly to ensure that it maintains integrity in the information it provides its students and communities. The College has focused on making its website thoroughly accessible and information-rich.

Standard II: Student Learning Programs and Services

The College continues to offer high-quality courses and programs with rigorous standards, meeting lower and upper division general education requirements to support the Bachelor of Science degree. Librarians have examined the collection and developed a plan for adding resources to support the Bachelor of Science degree. The College has designed specific student services to support students in the Bachelor of Science degree program.

Standard III: Resources

The College has developed a comprehensive plan to ensure that resources are in place to support the Bachelor of Science degree. The College has invested resources for hiring additional faculty who meet the minimum qualifications in their disciplines and are on an evaluation cycle. Administrators and staff supporting the program also have a yearly evaluation cycle. The College has earmarked financial resources and facility space for an additional repurposed lab and equipment for the program.

Standard IV: Leadership and Governance

Bakersfield College is a member of the Kern Community College District. The District Consultation Council is a participatory governance body with representatives from all employee groups and all three colleges. The College follows a participatory governance model with representatives from all employee groups and student government participating on committees and sharing in the decision-making process. All groups are

represented at College Council, which is chaired by the President. Planning occurs through the Strategic Directions process, which sets out planning initiatives for the next three years. These initiatives are embedded in governance committee and administrative work plans. Each unit of the college (instruction, student services, and administrative services) participates in the program review process annually.

H. Evidence that the baccalaureate program meets the minimum requirements for the degree (120 semester units or equivalent)

Sixty lower division units include 41 units of lower division General Education and 19 units of required technical coursework in Electronics Technology. Sixty upper division units include 51 units in technical topics specifically targeting automation and 9 units of upper division General Education coursework. Upper division coursework will cover a broad range of industrial topics including automation networks and systems, automation measurement and motion control, and automation applications in manufacturing and production processes, but will also include courses in project management, leadership and entrepreneurship, quality assurance and facilities planning and operations.

I. Evidence that the baccalaureate program meets the minimum baccalaureate level General Education requirements

For the first two years of the program, students will be expected to satisfy the general education requirements outlined in the California State University General Education Breadth course list in addition to the existing electronics courses that comprise the technical core to prepare for upper division coursework. Nine units of upper division GE coursework linked to the program level outcomes will be required: technical writing, psychology of industrial organization, and ethics in industry. These courses will be broad in nature, but will also include specific applications to businesses supporting the identified industry sectors utilizing automation.

Lower Division Curriculum

CSU GE Breadth	BC Course	Required Number of Units	Number of Units for BSIA
A.1 Oral Communication	COMM B1, B4, or B8	3	3
A.2 Written Communication	ENGL B1a	3	3
A.3 Critical Thinking	Student may choose	3	3
B.1 Physical Universe	PHYS B2a or higher required - satisfies B.3 Lab requirement*	3	4
B.2 Life Science	Student may choose	3	3
B.3 Laboratory Activity			*
B.2 Mathematics/Quantitative Reasoning	MATH B1a	3	4
C. Arts and Humanities	Student may choose	9	9
D. Social Sciences	Student may choose	9	9
E. Lifelong Learning and Self-Development	Student may choose	3	3
Total		39	41

Upper Division Curriculum

Upper Division General Education	Units
Technical Writing	3
Industrial Organizational Psychology	3
Industrial Ethics	3
Total	9

J. Evidence that library and learning resources are sufficient in quality, currency, variety, quantity, and depth to support the baccalaureate program

The Grace Van Dyke Bird Library’s mission is to contribute to and support the mission of Bakersfield College by serving as an information and research center and by providing direct and instructional support with a full range of timely information resources. The Library’s primary goals are to help students college-wide learn and succeed, and to support the college curriculum by serving students, faculty, staff, and administration. The library is staffed with knowledgeable tenured and adjunct librarians who will conduct subject-specific orientations on the use of resources. Library faculty collaborate with instructional faculty in the management of acquisition of various resources required for student success. Library faculty also instruct students in the navigation and assessment of resources. This instruction is completed within groups, such as class orientations and workshops, or on an individual basis.

The Library at Bakersfield College offers a vast collection of resources in both print and electronic formats. Students and faculty may access the electronic resources while off campus (simply by entering their school identification number) 24 hours a day, 7 days a week, 365 days a year. The Library currently owns 100,100 books (including 11,110 electronic books) and has subscriptions to more than 100 periodicals. The Library also has online subscription access to more than 160,000 electronic books, in addition to the database provider EBSCOhost (which encompasses 26 databases), and ten independent research databases. In total, students and faculty have access to over 7,000 full-text periodicals with a large number relating to Industrial Automation:

- Applied Physics – 37
- Civil and environmental engineering – 203
- Computer Science – 188
- Electrical and computer engineering – 222
- Industrial and management engineering – 93
- Mechanical engineering – 68

Over 100 new resources—databases, technical reference books, and industry-specific periodicals—have been identified by faculty and are budgeted for purchase during the next two years. In cooperation with the Industrial Automation faculty, the Library is examining an additional database: EBSCO’s *Applied Science and Technology Source*. This database will provide access to 1,350 journals and indexing for 4,000. The resources available within *Applied Science and Technology Source* include the leading trade and professional journals, applicable conference proceedings, and buyers’ guides.

In addition, Research Guides for upper division courses will be developed and will be made available on the library's website.

K. Evidence that faculty qualifications are rigorous and appropriate in regard to:

K.1. Discipline expertise

K.2. Level of assignment (at least one degree level above the baccalaureate degree for faculty assigned to baccalaureate degree courses or equivalent)

The Engineering and Industrial Technology Department will provide faculty support for the baccalaureate program. Four full-time faculty possess the minimum qualifications and discipline knowledge (ranging from industrial automation to engineering and industrial graphics) to teach upper division courses within the program:

- ✓ Manuel Fernandez, M.S. in Electrical Engineering
- ✓ Jason Dixon, M.S. in Engineering Technology, Department Chair
- ✓ Patrick Aderhold, PhD in Materials Engineering
- ✓ Klint Rigby, B.A. in Industrial Technology and M.A. in Education

Coursework in the electronics program will provide the technical preparation for the upper division coursework in the baccalaureate program. Currently, the department has three full-time faculty and five adjunct faculty minimally qualified for instruction in this lower division coursework.

Over the eight year term of the pilot program, four additional faculty will be hired under the minimum qualifications for engineering which requires a masters degree. For this program, we will seek candidates with expertise in electrical or industrial engineering.

Upper division general education courses will be taught by current full-time faculty in the English, Philosophy and Behavioral Science Departments, all of which possess masters degrees in their discipline.

In addition, the Dean of Instruction who will manage the baccalaureate program possesses an M.E. in Industrial Engineering and taught engineering in the Engineering and Industrial Technology Department for over 20 years.

Links to Evidence

1. KCCD Board of Trustees Meeting Minutes – BC Mission – May 15, 2015
https://www.bakersfieldcollege.edu/sites/bakersfieldcollege.edu/files/Baccalaureate_KCCD-BOT_5.15.2015-Mission.pdf
2. College Mission Statement
<https://www.bakersfieldcollege.edu/about>
3. President Christian’s Letter of Support for SB850
<https://www.bakersfieldcollege.edu/sites/bakersfieldcollege.edu/files/ChancellorHarrisLetterFeb1.pdf>
4. College Council Minutes – February 7, 2014
<https://committees.kccd.edu/sites/committees.kccd.edu/files/feb0714.pdf>
5. Academic Senate Minutes – April 23, 2014
<https://committees.kccd.edu/sites/committees.kccd.edu/files/AS%20Min%2004-23-14%20Approved.pdf>
6. KCCD Chancellor Sandra Serrano letter to support SB850
<https://www.bakersfieldcollege.edu/sites/bakersfieldcollege.edu/files/SUPPORT%20SB%20850%208-22-14.Governor.pdf>
7. KCCD Board of Trustees Action Report – Baccalaureate Presentation – November 13, 2014
[http://www.boarddocs.com/ca/kccd/Board.nsf/files/9TFUN6786EA1/\\$file/Action%2011-13-14%20Board%20Docs.pdf](http://www.boarddocs.com/ca/kccd/Board.nsf/files/9TFUN6786EA1/$file/Action%2011-13-14%20Board%20Docs.pdf)
8. Baccalaureate Degree Program – BC Letters of Support
<https://www.bakersfieldcollege.edu/baccalaureate-degree/letters-of-support>
9. Announcement of initial California Community College Board of Governors Approval
http://californiacommunitycolleges.cccco.edu/Portals/0/DocDownloads/PressReleases/JAN2015/PR_4yrDegree-January-20-2015_final.pdf
10. California Community College list of initially approved programs, January 2015
http://extranet.cccco.edu/Portals/1/ExecutiveOffice/Board/2015_agendas/January/California_Community_Colleges_Baccalaureate_Degree_RECOMMENDED_PILOT_PROGRAMS_final_Jan-2015.pdf
11. California Community College Board of Governors Approves Program for Pilot, March 16, 2015
http://californiacommunitycolleges.cccco.edu/Portals/0/DocDownloads/PressReleases/MAR2015/PR_4YearDegreeMarchApp_March-16-2015.pdf
12. Industrial Automation Advisory Board Meeting Minutes – June 19, 2015
<https://www.bakersfieldcollege.edu/download/14234>

13. Educational Master Plan
https://www.bakersfieldcollege.edu/sites/bakersfieldcollege.edu/files/2014_EducationalMasterPlan_0.pdf
14. Strategic Directions
https://www.bakersfieldcollege.edu/sites/bakersfieldcollege.edu/files/StrategicDirections_Final_0.pdf
15. Program Review Committee
<https://committees.kccd.edu/bc/committee/programreview>
16. KCCD Board of Trustees SB850 Resolution
https://www.bakersfieldcollege.edu/sites/bakersfieldcollege.edu/files/SB850_KCCD_BOT_Resolution.pdf
17. KCCD Board of Trustees Minutes approving Resolution – May 8, 2014
https://www.bakersfieldcollege.edu/sites/bakersfieldcollege.edu/files/KCCD_BOT_Minutes_5-8-14.pdf
18. BC Academic Senate Resolution No. 4 – September 28, 2014
http://www2.bakersfieldcollege.edu/committees/AcadSenate/Resolutions/1415/AS_Resolution_4.pdf
19. Baccalaureate of Applied Science: Industrial Automation Official Application
https://www.bakersfieldcollege.edu/sites/bakersfieldcollege.edu/files/BA_BAS_Application_Dec_19_2014.pdf
20. KCCD Board of Trustees Meeting Minutes – BC Catalog – May 15, 2015
https://www.bakersfieldcollege.edu/sites/bakersfieldcollege.edu/files/KCCD_BOT_Minutes5-15-15.pdf
21. Kern Community College District, Bakersfield, California, *Financial Statements and Supplementary Information with Independent Auditor's Reports* - June 30, 2014
<https://www.kccd.edu/sites/kccd.edu/files/Kern%20CCD%20Final%20Audit%202014.pdf>
22. BC College Catalog
https://www.bakersfieldcollege.edu/sites/bakersfieldcollege.edu/files/BC_Full_Catalog_2015-16.pdf
23. CCC Baccalaureate Degree Study Group:
https://www.bakersfieldcollege.edu/sites/bakersfieldcollege.edu/files/CCC_Baccalaureate_Study_Group_Report.pdf