**Bakersfield College**

**Comprehensive Program Review**

**I. Program Information:**

Program Name: Electronics Technology (CA), Industrial Technology, Electronics Technology Option (AS)

Program Type: [x]  Instructional [ ]  Student Affairs [ ]  Administrative Service

***Bakersfield College Mission****:* 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.

Describe how the program supports the Bakersfield College Mission:

**The Electronics Technology program at Bakersfield College provides training for electronics technicians, automation technicians, instrumentation technicians, consumer electronics technicians, maintenance mechanics, radio and telecommunications technicians, installation technicians, electronic systems fabrication technicians, operators, and other related occupations. In the near future, we will also provide classes for a new Engineering Technician Associates of Science degree.**

**Bakersfield College, as part of the California Community College system, provides CTE, transfer, and basic skills coursework. Our program successfully serves the CTE statewide goal for our discipline. In addition, we have participated in several of the strategic goals and initiatives of the college, including student success (though our participation in the C6 consortium and its activities), and fiscal sustainability (through our participation in the STEM program and through sizeable grants from Chevron and the Central California Section of the International Society of Automation. Our facilities and equipment are exemplary among similar programs in the State, and as such, they have contributed both to student success and a positive example of Bakersfield College’s commitment to relevant technology and high-wage, high-growth occupations within our service area.**

Program Mission Statement:

**The EIT faculty and staff strive to offer effective, up to date and student centered instruction, being sensitive to the diversity of our students, their educational needs, and their career goals. The Electronics Technology program is one of the EIT programs. We provide relevant course and lab work geared toward day and night students seeking careers in EIT related fields, also meeting the needs of students seeking training for career advancement or skills updating. We use a multi-dimensional approach in preparing our students not only for their specific career goals, but also provide activities that assist them with meeting their personal, academic, and intellectual goals. Our faculty actively pursues professional development, program/facilities improvement, and college/community involvement, seeking partnerships and collective efforts.**

**Our program, first and foremost, provides our diverse student population with the ability to earn a degree, a Certificate of Achievement, and four different Work Skills Certificates as evidence of their participation in this career and technical education program. Our rigorous and technically challenging program develops the skills and competencies in technical support fields within the various industry sectors for which we prepare students.**

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| ***Instructional Programs only:***1. List the degrees and Certificates of Achievement the program offers

**Industrial Technology, Electronics Technology Option AS Degree****Electronics Technology Certificate of Achievement**1. If your program offers both an A.A. and an A.S. degree in the same subject, please explain the rationale for offering both.

**We only offer an AS degree.**1. If your program offers a local degree in addition to the ADT degree, please explain the rationale for offering both.

**No ADT degree is available in our discipline.** |

**II. Progress on Program Goals, Future Goals, and Action Plans:**

1. List the program’s current goals. For each goal (minimum of 2 goals), discuss progress and changes. If the program is addressing more than two goals, please duplicate this section. **NOTE: IN THE COMMENTS, “INDA” REFERS TO THE INDUSTRIAL AUTOMATION BACHELOR’S DEGREE PROGRAM/COURSES**

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| **Current Program Goals** | **Which institutional goals from the 2015-2018 Strategic Directions for Bakersfield College will be advanced upon completion of this goal? (select all that apply)** | **Progress on goal achievement****(choose one)** | **Comments** |
| 1. Utilize both the Electronics Technology Advisory Committee and the BS Industrial Automation Advisory Committee to refine the course content and goals/outcomes of the short-term certificate, two-year certificate/AS degree, and the BSIT educational levels to create a seamless pathway to employment within the industry sectors we serve. | [x]  1: Student Learning [x]  2: Student Progression and Completion [ ]  3: Facilities [ ]  4: Oversight and Accountability [ ]  5: Leadership and Engagement  | [ ]  Completed: \_\_\_\_\_\_\_\_\_\_ (Date) [ ]  Revised: \_\_\_\_\_\_\_\_\_\_ (Date)**[x]** Ongoing: \_\_\_2016-17 (Date) | The BS Industrial Automation Advisory Committee was developed in spring 2015, and currently includes 33 members from a diverse set of industry, governmental, and educational representatives. Feedback on CORs for the 17 new INDA courses, in addition to the current ELET courses is an ongoing process. |
| **Current Program Goals** | **Which institutional goals from the 2015-2018 Strategic Directions for Bakersfield College will be advanced upon completion of this goal? (select all that apply)** | **Progress on goal achievement****(choose one)** | **Comments** |
| 2. Refine the curriculum and course delivery systems to provide the maximum flexibility for students to receive their educational levels of choice. | [x]  1: Student Learning [x]  2: Student Progression and Completion [ ]  3: Facilities [ ]  4: Oversight and Accountability [ ]  5: Leadership and Engagement  | [ ]  Completed: \_\_\_\_\_\_\_\_\_\_ (Date) [ ]  Revised: \_\_\_\_\_\_\_\_\_\_ (Date)**[x]** Ongoing: \_\_\_2016=17 (Date) | As we develop the INDA courses, where possible the content is being placed in Canvas in order to later allow online or hybrid delivery of courses. Advanced sections of ELET program courses currently being developed will be offered in hybrid format, with the beginning courses also being converted to hybrid format, so that advanced courses can be offered regularly without concern of minimum enrollment per section. The basic and advanced classes can be offered at the same time frame. Additional curriculum work is currently being done on ELET courses through the CCPT-2 grant. |
| 3. Develop logistical and development plans, and implement those plans for each of the lab facilities that serve our program. | [x]  1: Student Learning [x]  2: Student Progression and Completion [ ]  3: Facilities [ ]  4: Oversight and Accountability [ ]  5: Leadership and Engagement  | [x]  Completed: \_\_\_2016\_\_\_ (Date) [ ]  Revised: \_\_\_\_\_\_\_\_\_\_ (Date)**[ ]** Ongoing: \_\_\_\_\_\_\_\_\_\_ (Date) | We were able to obtain a fourth lab when the AERA Stem Success Center allowed relocation of the MESA program, and that facility was remodeled into a robotics lab. The challenge now is offering the INDA classes at night due to the lack of lab space at that time. This goal should now be moved to the INDA program review |

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| **Current Program Goals** | **Which institutional goals from the 2015-2018 Strategic Directions for Bakersfield College will be advanced upon completion of this goal? (select all that apply)** | **Progress on goal achievement****(choose one)** | **Comments** |
| 4. Develop clear pathways for each possible career path within our area of “technical support systems for commercial and industrial sectors. | [x]  1: Student Learning [x]  2: Student Progression and Completion [ ]  3: Facilities [ ]  4: Oversight and Accountability [ ]  5: Leadership and Engagement  | [ ]  Completed: \_\_\_\_\_\_\_\_\_\_ (Date) [ ]  Revised: \_\_\_\_\_\_\_\_\_\_ (Date)**[x]** Ongoing: \_2016-17\_\_ (Date) | We are in the process of converting some of our Job Skills Certificates into Certificates of Achievement. We are also looking at the sequence of courses and schedule of course offerings to allow students to complete their certificate/degree requirements in a more reasonable time frame. Our recent increase in enrollment and number of sections appear to be allowing this to happen, although course waitlists continue to be a challenge to some students’ timely completion. |
| 5. Improve course outcomes, particularly in beginning-level courses, and those taught by more than one instructor. | [x]  1: Student Learning [x]  2: Student Progression and Completion [ ]  3: Facilities [ ]  4: Oversight and Accountability [ ]  5: Leadership and Engagement  | [ ]  Completed: \_\_\_\_\_\_\_\_\_\_ (Date) [ ]  Revised: \_\_\_\_\_\_\_\_\_\_ (Date)**[x]** Ongoing: \_\_2016-17\_ (Date) | Increased coordination between instructors of ELET B1, targeted strategies for ELET B5 and ELET B70 students, as well as incorporating “Habits of Mind” strategies into beginning courses have been the steps we have been taking. We will compare class performance this and next year with the baseline of 2014-15 year to see if these strategies have been successful. |

1. List the program’s goals for the next three years. Ensure that stated goals are specific and measurable. State how each program goal supports the College’s strategic goals. Each program must include an action plan.

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| --- | --- | --- | --- | --- |
| **Future Goals** | **Which institutional goals from the 2015-2018 Strategic Directions for Bakersfield College will be advanced upon completion of this goal? (select all that apply)** | **Action Plan** | **Timeline for Completion** | **Lead person for this goal** |
| 1. Utilize both the Electronics Technology Advisory Committee and the BS Industrial Automation Advisory Committee to refine the course content and goals/outcomes of the short-term certificate, two-year certificate/AS degree, and the BS INDA educational levels to create a seamless pathway to employment within the industry sectors we serve. | [x]  1: Student Learning [x]  2: Student Progression and Completion [ ]  3: Facilities [ ]  4: Oversight and Accountability [ ]  5: Leadership and Engagement  | Course content and lab activities will be regularly reviewed by our advisory committees, with a focus on specific employability skills.  | Appreciable progress by 2018-19. | Roy Allard and ELET program faculty |
| 2. Refine the curriculum and course delivery systems to provide the maximum flexibility for students to receive their educational levels of choice. | [x]  1: Student Learning [x]  2: Student Progression and Completion [ ]  3: Facilities [ ]  4: Oversight and Accountability [ ]  5: Leadership and Engagement  | Where possible, courses will transition from a totally face-to-face delivery system to a hybrid delivery. “Active learning” strategies will be incorporated so that the online delivery portion of the class is relevant and effective. | 2018-19 assuming curriculum development funding is available  | Sean Caras and ELET program faculty |
| 3. Develop clear pathways for each possible career path within our area of “technical support systems for commercial and industrial sectors. | [x]  1: Student Learning [x]  2: Student Progression and Completion [ ]  3: Facilities [ ]  4: Oversight and Accountability [ ]  5: Leadership and Engagement  | Students should be able to choose from a set of career options and have a clear plan of courses, sequence, and schedule in order to achieve the desired career goal. The pathways should be clearly communicated and user-friendly, particularly with scheduling and completion. | 2017-18 | Sean Caras and ELET program faculty |
| **Future Goals** | **Which institutional goals from the 2015-2018 Strategic Directions for Bakersfield College will be advanced upon completion of this goal? (select all that apply)** | **Action Plan** | **Timeline for Completion** | **Lead person for this goal** |
| 4. Improve course outcomes, particularly in beginning-level courses, and those taught by more than one instructor. | [x]  1: Student Learning [x]  2: Student Progression and Completion [ ]  3: Facilities [ ]  4: Oversight and Accountability [ ]  5: Leadership and Engagement  | Research and implement strategies to improve the course outcomes for the beginning classes ELET B1, ELET B5, and ELET B70 in terms of success and retention rates. | Appreciable progress by 2018-19. | Manuel Fernandez for ELET B5 and Roy Allard for ELET B1 and ELET B70 |
| 5. Develop and implement a regular schedule of meetings for program coordination, short and long-term planning, and general discussions between program faculty members, our adjunct instructors, our Department Chair, and our Dean of Student Learning. | [x]  1: Student Learning [x]  2: Student Progression and Completion [ ]  3: Facilities [ ]  4: Oversight and Accountability [ ]  5: Leadership and Engagement  | With the rapid growth of the program, including new faculty and increased adjunct instructor usage, we need to schedule regular meetings (on a weekly or bi-weekly basis) between full-time faculty members, with periodic meetings to include full-time faculty members, our Department Chair, and our Dean to ensure that both the lower-division ELET program and the Baccalaureate program are coordinated in such a way that all involved faculty and administration work together in a pro-active manner. While this has been done on an as-needed basis in the past, a formal schedule of meetings will be implemented from this point forward. Additionally, interaction with adjunct faculty that previously occurred on an individual basis will now be accomplished with at least a monthly meeting with all adjuncts teaching a specific course. | Accomplished by end of Fall 2016 semester | Roy Allard |

**III. Trend Data Analysis:**

Review the data provided by Institutional Research. Provide an analysis of program data throughout the last three years, including:

1. Changes in student demographics (gender, age and ethnicity).
2. Changes in enrollment (headcount, sections, course enrollment, and productivity).
3. Changes in achievement gap and disproportionate impact.
4. Success and retention for face-to-face as well as online/distance courses.
5. Degrees and certificates awarded (three-year trend data for each degree and/or certificate awarded).
6. Other program-specific data (please specify or attach).
7. List degrees and certificates awarded (three-year trend data for each degree and certificate awarded). Include targets (goal numbers) for the next three years.

**Enrollment has increased steadily since 2011-12 (census and unduplicated headcount) every year, with one exceptional year for unduplicated headcount.**

**Productivity remained fairly flat for that time period, despite the addition of a full-time faculty member. In other words, our enrollment increased enough to maintain the increase in sections that were offered without significantly effecting productivity. Program retention since 2011-12 varied from 81% to 88% (relatively flat), and program success varied from 65% to 72% during the same time period (also relatively flat). Success by age, gender, and ethnicity appears as follows: females (7% of our students last year) had a total of 6% less success than males; students 19 years and younger had the greatest deficiency in success – 14% less than the average of the other age groups; for “success”, whites equaled the college as a whole, African Americans were 11% below the college average, Asian/Pacific Islanders were 9% above the college average, and Hispanic/Latino students were 4% above the college average, 15% below Asian/Pacific Islanders in the program, and 5% below whites in the program. There were no online courses offered in our program. Demographically, student ethnicity remained fairly consistent over the time frame, as did the age range of students. For occupational and VTEA core indicator data, please see the CTE portion of the program review.**

**Course Enrollments Data**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **2011-12** | **2012-13** | **2013-14** | **2014-15** | **2015-16** | **3-year Change****2013-2016** |
| **Active Sections** | **17** | **19** | **26** | **32** | **36** | **+28%** |
| **% Change from 2011-12** |  | **+11%** | **+52%** | **+88%** | **+112%** |  |
| **Census Enrollment** | **391** | **415** | **490** | **624** | **726** | **+48%** |
| **% Change from 2011-12** |  | **+6%** | **+25%** | **+60%** | **+86%** |  |
| **% Change from Previous Year** |  | **+6%** | **+18%** | **+27%** | **+16%** |  |
| **Unduplicated Headcount** | **229** | **275** | **273** | **359** | **391** | **+43%** |
| **% Change from 2011-12** |  | **+20%** | **+19%** | **+57%** | **+71%** |  |
| **% Change from Previous Year** | **-19%** | **+20%** | **-1%** | **+32%** | **+9%** |  |

**Certificate and Degree Attainment**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Full Name of Degree or Certificate | 2011- 2012 | 2012- 2013 | 2013- 2014 | 2014- 2015 | 2015- 2016 | 2016- 2017 |
| **Industrial Technology, Electronics Technology Option AS (included are anomalies of 1 award each for degrees we were not aware even existed)** | **6** | **5** | **6** | **9** | **6** | **Not Applic.** |
| **Electronics Technology CA** | **13** | **9** | **10** | **5** | **10** | **Not Applic.** |
| **Industrial Automation JSC** | **Didn’t exist** | **Didn’t exist** | **3** | **5** | **14** | **Not Applic.** |
| **Industrial Communication JSC** | **Didn’t exist** | **Didn’t exist** | **12** | **10** | **10** | **Not Applic.** |
| **Industrial Maintenance JSC** | **Didn’t exist** | **Didn’t exist** | **5** | **15** | **21** | **Not Applic.** |
| **Manufacturing Automation JSC** | **Didn’t exist** | **Didn’t exist** | **11** | **18** | **7** | **Not Applic.** |
| **Total AS, CA, JSC’s** | **19** | **14** | **57** | **63** | **68** | **Not Applic.** |

**We wonder how one would accurately predict projections for degrees and certificates awarded, since each year we have available data we see inconsistent numbers from year to year. How are other programs doing this other than just guessing? Since we are essentially asked to make a guess as our goals, here are mine: AS degree – increase by 2 per year for next 3 years. CA – increase by 3 per year for next 3 years, JSC’s increase the total of all five by 5 per year per JSC for the next 3 years. This will be a moot point should A&R develop a process for automatically awarding degrees and certs when students qualify for them. We strongly support automating the issuance of certificates (JSC and CA’s), which we are confident will increase the number of certificates awarded by 20% or more.**

**IV. Program Assessment:**

Use attached **Assessment Report Form Comprehensive Tab**

1. Discuss your program’s strengths.
* **Positive growth: Since 2011-12, our Electronics Technology (ELET) program’s census enrollment has increased by 86%, unduplicated headcount has increased by 71%, and the number of sections offered has increased 112%. These statistics exceed Bakersfield College as a whole during that same time frame with a 5.6% increase in census enrollment and an 8.8% increase in the number of sections – evidence that program growth is attributable to far more than enrollment growth of the college in general.

*Compared with the other disciplines* in the Engineering and Industrial Technology department during the same time frame, our unduplicated headcount growth is #1 at 71%, (compared to Engineering at 54% and Welding at 27%), and our number of sections growth is also #1 at 112% (compared to Engineering at 57% and Welding at 53%).

We feel this growth is attributed to the following factors: 1) A positive reputation of the program among students and local employers that encourages friends, family members, and employees to attend classes in our program, 2) An understanding that there are plenty of job opportunities within our industry sectors due to attrition/replacement as well as a growth rate exceeding the state and national averages in many of the occupational titles, 3) An understanding that careers in our area lead to high wage potential and working conditions suitable for an entire career span, 4) A comprehensive offering of classes that prepare our technical professionals for five different industry sectors in Kern County so their skills and knowledge is portable should they wish to work in a different industry sector than they initially are employed, 5) Exemplary facilities, equipment, course resources, as well as professors and instructors who all have prior or current industry experience, and 6) A greater awareness of our program among high school students (which is still just a small amount compared with the potential awareness that could be accomplished through a major marketing effort).**

**We expect growth in our lower-division ELET coursework to increase by double-digits annually as the awareness of our Baccalaureate degree increases. This fall, we already have dozens of students who are starting the program specifically with the goal of attaining the B.S. degree, and we are experiencing inquiries from throughout the state, across the country, and also from international students.**

* **Administrative support: We are exceptionally blessed with a supportive administration from our Dean of Student Learning up through our College President. Our Dean, Liz Rozell, is uniquely qualified to lead the expansion of our program to the Baccalaureate level, due to her education and experience in Industrial Engineering, and has instructional expertise to understand the program and its unique challenges. She has worked to include our Automation portion of the program into the STEM disciplines, resulting in the ability to access STEM grant funds to expand our stock of automated equipment. Our College President, Dr. Sonya Christian, has been a strong advocate for Career and Technical Education in general, and has taken a special interest in our program specifically along with other College discipline areas targeted for improvement and expansion.**
* **Financial support through grants and donations: We have experienced a recent influx of funds available for program improvement and our Baccalaureate program implementation from a number of state and federal grants, as well as a fairly recent $125,000 donation from Chevron and in excess of $45,000 donated since 2007 to benefit our program and our students from the Central California Section of the International Society for Automation. Other funding sources utilized in recent years and for this year are: Proposition 39 grant ($75,000 last year and $45,000 this year), STEM grant (several hundred thousand dollars to date), Perkins/VTEA funding (approximately $75,000 this year and a similar amount over the past several years combined), CCPT-2 grant (approximately $90,000 last year and potentially a similar amount this year), and the Bachelor’s Degree Pilot (BDP) start-up grant (well over $100,000 spent on equipment and facilities improvements to date).**
* **Facilities and instructional equipment current resources and recent improvement: Our program has an exceptional stock of instructional equipment, supporting hands-on lab activities in the ten ELET courses we currently teach. Our lab facilities are also exceptional in comparison to other Electronics program throughout the state, in the sense that they are completely “finished” rooms, rather than older “shop” style facilities with open ceilings, unfinished walls, and bare concrete floors. We have one brand-new robotics/automation lab, and a Computer Integrated Manufacturing lab remodeled in 2004. Our remaining two Electronics labs were remodeled 22 years ago, but they have been well-maintained.

Over the summer, Manuel Fernandez with the assistance of Roy Allard, student volunteers, M&O personnel, and our department maintenance technician completely reconfigured the CIM lab, installing new Programmable Logic Controller training equipment, adding the infrastructure to being work on the Industrial Networks course for the Baccalaureate degree, and interconnecting all the automated equipment to the new computers for a functional industrial network for use in several lower-division courses and one upper-division course.

Sean Caras, along with student volunteers, reconfigured one wall in the IT6 lab to utilize the Variable Frequency AC Motor “Drives” training equipment we have, added Ethernet wiring to interconnect motor controls and instrumentation equipment in the lab, and reconfigured areas of the lab in order to make space for the new equipment that has been and will be purchased for lower and upper-division technical courses.**
* **Industry involvement: We are very fortunate to have such a supportive industrial community of major employers as well as smaller businesses that participate in our advisory committees (for the ELET program and the Industrial Automation B.S. degree program), host student tours, occasionally donate components used in demonstrations and College-built training equipment, as well as provide guest speakers and technical support.**
* **Outreach efforts focused on middle school and high school students: In the recent past, we helped set up an Electronics course at Independence High School. We also connect with Project Lead the Way (PLTW) programs that are in almost a dozen high schools and middle schools in the county. These programs are excellent “feeder” programs for us, specifically in the Computer Electronics and the Computer Integrated Manufacturing PLTW programs found in several local high schools.

In recent years, several of our faculty members offered “drone technology” summer camps for a number of audiences, including: middle school Agriculture-focused students, middle school STEM-focused students, and also for incoming Engineering students through MESA “Week Zero.”**

**This summer, program faculty members assisted the new instructor for a brand-new Automation program at the Kern High School District Regional Occupational Center (KHSD ROC) in equipment purchasing, lab design, curriculum, and other essential issues. The new instructor is actually a former student in our program that recently went through a C6 grant/program cohort in Manufacturing Automation.**

**Additionally, we have been involved with the Delano High School District in helping them plan for a dual-enrollment program specifically focused on the lower-division coursework for our Baccalaureate degree that will be part of a new high school in Earlimart that hopefully will be built within the next three years.**

* **Probable expansion of dual-enrollment courses, rural education initiatives, and other feeder programs for our lower and upper division technical programs: A major focus on expanding course offerings on high school campuses through dual enrollment, and expanding course offerings at our rural areas covered by the Delano Center and the Arvin area. The new KHSD ROC program is positioned to provide college credit for three of our Baccalaureate degree lower-division required Electronics courses through dual enrollment. There is a potential to offer most or all of the lower-division Electronics courses for the Baccalaureate at the Delano Center. These dual-enrollment opportunities and rural education course offerings expansion will increase the pipeline for students to complete our lower-division certificates and degree, as well as attain the Baccalaureate degree.**
* **Interdisciplinary instructional opportunities: In the recent past, we helped the automotive electrical systems professor with construction of training equipment, and give lab tours and presentations specific to both the electrical drafting and the piping drafting course. As part of the Baccalaureate degree coursework, three upper-division general education courses in the areas of psychology, sociology, and technical writing are bring developed that are industrial-focused. Working with the faculty members in those disciplines developing those courses has been very enlightening to us who are involved in the discussions.**
1. Discuss your program’s weaknesses.

**Please understand that we feel the identified weaknesses of the program due to insufficient resources are not a result of a conscious lack of support by our administration, but are a result of limited resources available to the College, policies and operational structures that are not adaptable to exceptional situations, and other factors outside of the direct control of our administration. By identifying the program’s weaknesses and challenges in detail, our administration can more clearly understand what is necessary to allow the program’s growth to continue, to ensure a successful Bachelor’s Degree Pilot, and to maintain a healthy work environment for program faculty members. The specific weaknesses and challenges are:**

* **Rapid growth of the program: The rapid expansion of our Electronics Technology (ELET) program, as well as adding an entirely new instructional program to it (the Baccalaureate degree), has diverted focus and time from the improvements that would otherwise been possible with less aggressive growth and no expansion of the program.

However, to be fair, there have been a couple of helpful and appreciated efforts that support our existing lower-division program. Our Dean has built hourly compensation into the CCPT-2 grant work plan for program faculty to update curriculum, align it to the various connected programs (dual enrollment, etc.), and coordinate with those program teachers/instructors. Our Dean makes it a priority to stay aware of the added responsibilities of program faculty and is very sensitive to our workload when additional responsibilities appear.

The main issue is that the implementation of the Baccalaureate degree has been labor-intensive with program faculty spending significant time performing tasks that should be delegated to non-program staff and contracted labor (see next point).**
* **College and District policies and available resources are not sufficient to address the challenges associated with the implementation of the Industrial Automation (INDA) Bachelor’s Degree Pilot (BDP) program: When the decision to apply for the Baccalaureate pilot was made at the various levels (faculty, College administration, District administration, and the Board of Trustees), I suspect we all were so focused on the opportunities and benefits of being selected that we did not fully comprehend the amount of time and effort actually required to implement this degree program under such a tight timeline. We also did not realize the delays caused at the state Chancellor’s Office level, and how limited the time would actually be between the implementation phases. Now that we are well into implementation, we are experiencing the reality of what we have committed our College and program to.

With the full understanding that our Dean and College administration have all been very supportive and accommodating to the extent possible, they face constraints that have been imposed upon them by outside forces, resulting in the implementation of the INDA degree being far more time-consuming, complex, and taxing on participating faculty than it needs to be.**

**Please understand that we gratefully acknowledge the significant resources and accommodations that our College President and Executive Vice President have been able to provide (with the direction of our Dean), including: restructuring the administrative structure (particularly at the Dean of Student Learning level) to provide a reasonable workload and scope of responsibilities for our Dean, assigning a dedicated Counselor for STEM and the INDA program, allowing “special compensation agreements” to be offered to those involved in developing the Course Outline of Record for the 17 new INDA courses and the three new upper-division general education courses, offering special compensation for curriculum development work in the INDA courses, allowing our brand-new professor to team teach one of the more challenging INDA courses with the professor who has specializes in that content area, and securing a dedicated funding source for the Baccalaureate activities, among many other things.

Those resources and accommodations have been indeed helpful to the involved faculty members, yet each of us are close to “burning out” as we consider the tasks yet to be performed. The following list includes the challenges that still exist as we continue meet our full-time teaching responsibilities while simultaneously making progress on the remaining tasks of our INDA program.**

* + **Curriculum Development: The sheer amount of time actually required to develop curriculum for 17 new classes in less than two years does not appear to be readily understood throughout the administration. The current contact language limits assigned curriculum development compensation to only 50% of the student contact hours of one semester. This may be appropriate for a program that is adding or updating a few lecture-only classes, but it is not sufficient for the scope of work we need to accomplish for the Baccalaureate. It will be necessary for a faculty member to be compensated several different times for the same course, such as when the initial curriculum is created, and again when the course is adapted to hybrid or online delivery. The reasons why our coursework is more complex that in other disciplines and situation are:**
		- * **The structure of some INDA program courses mean that simple textbooks/instructional materials solutions are not possible. Several course topics normally being taught as stand-alone have been combined in this program. Several of the courses are specific to the program and local industry needs. Textbooks simply do not exist for those courses**
			* **Additionally, four of the INDA courses contain a strong lab component. The resulting implications are that a whole new set of equipment will be utilized for each class. And in each of the four classes, some of the lab activities come from College-built/designed equipment allowing students to perform upper-division level tasks that involve whole “systems” of automation and process control rather than individual items. Lab curriculum needs to be custom-developed.**
			* **The lack of lab availability for evening courses mean that Baccalaureate classes will need to switch to a hybrid delivery for those containing labs, and online delivery for lecture-only classes. Program enrollment is limited because some students work during the day when the classes are offered. It will take another round of curriculum development to implement online resources for most of the courses.**
	+ **Facilities Tasks: Facilities issues are explained in greater detail below, but the main issue is that facilities tasks performed by faculty members takes time away from specialized work that better utilizes faculty expertise. Moving and organizing stored equipment and materials, setting up equipment, organizing student lab resources, and similar tasks could be completed by paid student workers.**
	+ **Extra-curricular Tasks: Running the advisory committee, assisting with student outreach, managing equipment and supplies purchases, and other day-to-day responsibilities are competing for curriculum development and course implementation time.**
	+ **Faculty Hiring Timelines: The standard timeline for hiring faculty members (who are not paid until August to start working) means that new faculty for the Baccalaureate most likely will begin their teaching assignments only weeks before one or more of their classes are taught for the first time. In addition, there is no lead time for the new hire to start work in a prior semester or year.**
	+ **Equipment Installation and Related Tasks: While vendors have installers available to unpack, install, and set up purchased equipment for operation, there is significant work necessary to actually utilize the equipment in the course(s) that is never considered an obligation of the vendor or manufacturer as part of the installation process.**
	+ **Assistance and Expertise: Not all program faculty members have the expertise necessary to develop curriculum, perform technical tasks specific to running an Electronics/Automation lab, or other things that we need to accomplish. This places an uneven workload on those few faculty members that can do these specialized tasks. Those skilled faculty members are still required to teach a full load, and are expected to perform those specialized tasks by using their personal time. Even paying stipends does not address what faculty members are giving up in order to perform those tasks. The District is opposed to providing release time, which ultimately is the fair way of addressing this inequity.**
* **Program faculty professional obligations are beyond reasonable working conditions when compared with faculty members in other instructional programs: An unfortunate situation exists where we are in a sense being punished for our own success. Program faculty supported participating in this pilot project, but we were not the only ones who made a commitment to it. Unfortunately, we are paying the price for this. Faculty members should not have varying levels of responsibilities or expectations simply because of the program in which they teach, or by virtue of when they were hired.**
* **Facilities are still insufficient to implement another complete instructional program (the INDA BDP) to the extent required for adequate instructional results: Although we were able to add a new Robotics/Automation lab to our available facilities, the nature of some existing lower-division courses and the type of new lab-based courses for the Baccalaureate degree is problematic from a facilities issue. We were already maxed-out in the IT6 lab with the lower-division courses previously taught. Now with the Baccalaureate, we are adding two entirely new courses to the same lab footprint.**
* **Storage of equipment, supplies, demonstration items, and other necessities is still a major unaddressed problem: For a number of years through this program review process, we have asked that our lack of sufficient storage space be addressed, and we provided several options for accomplishing this. We are currently using an “office” space in the building that does not have heating or cooling, and we still have equipment stored in other places outside of the attached “lab service” spaces. This semester, we have to vacate the “office” space so that it can actually be used for faculty offices. There is only one storage room for our EIT department that we can use a portion of for our needs, but that space is far removed from our labs. We need a storage room that is close to our labs so that equipment and demonstration items not used daily can be moved in and out of storage as needed.**
* **Office space for new instructors in the program and department does not exist in the Industrial Technology building: We currently have a new Electronics faculty member, a new Engineering faculty member, and a new Industrial Safety faculty member that have to use an office in the Language Arts building across campus. The “office” we are vacating can be used for that, but it does not have heating and air conditioning since it was not able to be classified as office space during the building remodel 10 years ago.**
* **Maintenance support is inadequate, and will become a critical issue should our EIT Department maintenance technician’s position is not replaced when he retires at the end of the school year: The justification for hiring a replacement for our retiring department maintenance technician is provided elsewhere in this document. However, it is important to emphasize the specific deficiencies in the maintenance area that is seriously impacting our ELET and Industrial Automation programs. Our current department maintenance technician performs a full workload, but does not have the expertise to repair Electronics and Automation equipment. Repair of our equipment has been handled in the past by faculty members, but this is not part of our employment responsibilities. A dedicated lab technician for our program is the solution to this problem.**
* **The department structure is becoming increasingly inadequate: The coordination of our Electronics Technology program (lower-division certificate and AS degree), Industrial Automation program (Baccalaureate program), our interconnected Engineering Technology program (a stronger emphasis currently being placed on it), and our Engineering program (with increasing FTEF and new disciplines at CSUB related to Electrical and Computer Engineering) is difficult due to the current department structure with a department chair that is also responsible for TEN other disciplines. His release time was increased only 0.1FTE during the recent contract negotiations, and that did not even consider the number of disciplines involved or the fact that we have added the Industrial Automation degree program and a new Safety program to our department.**
1. *If applicable,* describe any unplanned events that affected your program.

**The most significant event that created far-reaching effects on our program within the past three years is being chosen as one of the 15 community colleges in California to offer a Baccalaureate degree - Industrial Automation (INDA) - as part of the pilot program (BDP). In both sections above: “program’s strengths” and “program’s weaknesses,” we covered in detail the benefits and drawbacks we have experienced so far. As noted above, those of us in the Electronics Technology (ELET) program were fully- committed when the initial application was made, and we continue to support this tremendous opportunity for our students, our educational community, our industrial community, and all others who will benefit from our Baccalaureate program. Despite the challenges, we have no regrets in agreeing to participate. However, we do feel that everyone involved has underestimated the impact this undertaking has on the existing ELET program and specifically the faculty members involved.**

**Please consider the overall impact of this new endeavor.**

* **Our Electronics program evolved from one of the first career and technical programs at Bakersfield College – estimated to have begun around 1917. Technological change was managed by instructional changes in an even, manageable pace for a period of almost 100 years.**
* **Prior to the BDP implementation, we had ten ELET courses regularly available to our students. All of those courses have evolved significantly through regular updating, but faculty members have literally had decades to develop and improve courses. Three of the ten were taught for two decades or more. Three were a result of combining two previous courses into one. Only four of those ten courses were implemented as new courses within the past 15 years.**
* **We were selected for the BDP in 2015, and during the fall 2015 semester (less than a year ago) COR’s for seventeen new upper-division INDA technical courses were developed and went through the curriculum approval process.**
* **Less than 6 months later, the first semester of upper-division INDA courses were offered in August 2016. The final (fourth) semester of INDA courses will have been launched only 18 months from now, with the first cohort of INDA students able to graduate with the degree in May, 2018.**
* **Our INDA degree was initially planned to utilize program faculty with only Bachelor’s degrees (two currently have only Bachelors’ degrees plus teaching and industry experience. Recently ACCJC ruled that a Master’s degree is the minimum qualification even for the new community college Bachelor’s degrees), removing those two professors from BDP instructional opportunities.**
* **As a result of this change, our College President has refocused faculty expansion in our program to allow the hiring of only INDA minimum-qualified faculty for the foreseeable future. While we understand her decision is a means to make our staffing as flexible as possible, the unintended result is that our program cannot consider some excellent faculty candidates for our ELET program lower-division courses – those with exceptional industry experience not usually found among those with a Master’s in Engineering, and who did not need a Master’s degree to advance in their profession – and it will be far more difficult to find candidates with the depth of technical expertise needed to implement lower-division advanced courses that have been suggested by industry leaders.**
* **Added to the challenges of implementing the Bachelor’s degree is an upcoming push for expansion of course offerings in Delano as well as dual enrollment courses in a number of schools within and outside of Bakersfield. This expansion, of course, is a positive benefit for our program, but adds even more responsibilities to an already overwhelmed group of faculty members. The hiring of new faculty will always occur at least a year later than when they are really needed to equitably spread out the responsibilities of this rapid growth and greater presence in high schools and college “centers”.**

**V. Resource Analysis:** To request resources (staff, faculty, technology, equipment, budget, and facilities), please fill out the appropriate form. <https://committees.kccd.edu/bc/committee/programreview>

1. Human Resources and Professional Development:
2. If you are requesting any additional positions, explain briefly how the additional positions will contribute to increased student success. Include upcoming retirements or open positions that need to be filled.

**We were completing this document under the impression that the program review for our Industrial Automation (INDA) program completed the necessary paperwork to request another faculty member for next year in order to staff the new sections of the INDA Bachelor’s degree coursework. Implementing the second (senior) year of the Baccalaureate will require additional staffing just to cover the new sections required for this. We are still experiencing record growth, with a three-year increase in sections of 28%, an increase of 48% in census count, and an increase of 43% in unduplicated headcount. We could use another new faculty member alone simply to handle the program growth.**

**We hope that the Baccalaureate program review also addresses the need for a classified position or a paid student worker (as a lab assistant) to help us maintain over $2 million in equipment for our 10 lower-division Electronics courses and for new 4 upper-division Industrial Automation courses. Additionally, we have four lab rooms that have a significant technical infrastructure that is beyond the scope of work of the College’s one Electrician, our one Electronics Technician, and our IT technicians. Equipment and lab infrastructure repair is certainly not within the scope of a faculty member’s professional obligations!**

**Though not in our program’s position request, we strongly emphasize the need to replace our Engineering and Industrial Technology (EIT) Department’s maintenance technician who is retiring at the end of this school year. With that position unfilled, lab equipment in most of the EIT disciplines will not be repaired in a timely manner, some repairs are not possible with local vendors and professors are not responsible for packing up and shipping the equipment to a distant vendor, specific equipment and facility fabrication projects will not be completed (resulting in lab activities not being available to students), and the general disrepair will continually increase to a point where not only instructional effectiveness is hindered, but also the safety of students and staff will be compromised. Faculty members do not have the time to coordinate contracting out the work our maintenance technician regularly performs, and the department budget is critically deficient to cover these expenses. Unlike in the sciences, where there is a lab technician for Biology and one for Chemistry, and in Agriculture that has someone specifically for a large portion of what is covered in that discipline, our EIT maintenance technician supports: Automotive, Construction, Electronics/Industrial Automation, Manufacturing, Welding, and Woodworking (six different disciplines) and provides logistic help for Industrial Drawing as well.**

1. Professional Development:
2. Describe briefly the effectiveness of the professional development your program has been engaged in (either providing or attending) during the last year, focusing on how it contributed to student success.

**In addition to the pursuit of standard professional development opportunities provided by the College, our three full-time program faculty have been extensively involved in the design of the Bachelor’s degree program courses and structure, the improvement of lab facilities and instructional equipment, and other efforts essential to both the ELET (Electronics Technology lower-division) and the INDA (Industrial Automation upper-division) programs.**

* **All three faculty members have performed extensive research related to equipment purchases. Hundreds of thousands of dollars of new equipment have been purchased in the past 12 months, and the choice of equipment has proved to be correct.**
* **All three faculty members performed extensive work in restructuring the three existing lab facilities to improve logistics issues, rebuilt existing installations of equipment in two of the labs, and performed curriculum development in lower and upper division courses. Students directly benefit from well-organized lab facilities, correctly operating equipment, and up-to-date technologies and lab equipment they will work with once they are employed.**
* **Two faculty members attended specific industry-offered training on the equipment that we utilize in our lab facilities.**
* **One faculty member received additional industry-specific training allowing him to teach courses in a specific technological area that was new to him in terms of previous experience and to the repertoire of courses he has been teaching. This not only benefits the program by the flexibility of faculty assignments; students also benefit from the instructor’s additional technical background.**
* **One faculty member was chosen as the faculty lead for the Baccalaureate program, and has attended numerous meetings and workshops offered for the colleges participating in the Baccalaureate pilot program.**
* **One faculty member visited and evaluated the course content, lab facilities/activities, and textbooks used in the IBEW (union Electrician’s) apprenticeship program (which gives BC college credit for their coursework) and determined that four of our ELET courses are equivalent to apprenticeship courses. This will allow apprentices who completed those courses to use them to meet certificate and degree requirements for our ELET program, and can apply those courses to the lower-division technical coursework required for the Baccalaureate.**
1. What professional development opportunities and contributions can your program make to the college in the future?

**We have not been asked to provide professional development for the college in the past, but if there are areas in which we can help, we are glad to do so.**

**We have wanted to partner with our entire department’s subject areas to put on a detailed presentation to our BC Counselors and Academic Advisors along with an open house and tours of our labs in order to help them understand our programs, what types of students we are targeting, how to best advise them on course and discipline choices, and other valuable information. We have so many recently hired Counselors and Advisors! Right now, the non-CTE Counselors and Advisors seem to only look at the BC catalog and the course sequences in the generic Educational Plans we’ve created. Students are not able to ask specific questions about our discipline and have the Counselor or Advisor answer them with confidence and accuracy.**

1. Facilities:
2. How have facilities’ maintenance, repair or updating affected your program in the past year as it relates to student success?

**We were fortunate to have received a newly-renovated lab facility in the S&E building that previously housed the MESA program. This new facility has brand-new computers, audio/visual equipment, the infrastructure (such as compressed air) needed for robotics and automation-related equipment, new furniture, IT infrastructure (including wired and wireless network access) and an overall renovated space. This additional lab is mission-critical in order to offer courses for our Industrial Automation Bachelor’s degree program, for the use of the Engineering program, for basic and advanced lower-division ELET courses, and potential uses in the STEM area as identified by our Dean.**

**In addition, BC maintenance and custodial staff (and our department’s Maintenance Technician) assisted in reconfiguring our Computer Integrated Manufacturing (CIM) lab in INDT 7a. “Slat wall” panels were installed allowing a mounting space for technology and training equipment for three ELET courses and one INDA course.**

1. How will your Facilities Request for next year contribute to student success?

**We have consistently requested additional storage space be created for the use of our program, since we have added four new lab classes for the Bachelor’s degree to the ten lab classes we already teach. Our three lab rooms in the Industrial Technology building are full to their limit, and in order to “make due” with our existing facilities, we have made the equipment that is not used consistently throughout each semester into portable units that can be moved in and out of the labs as needed. We have only three small storage rooms, and those are at capacity as well. One of the storage rooms is actually an office space on the second floor of our building. We have to vacate that room this semester in order for the room to be used as faculty offices. We have also spread out our overflow into the hallway on the second floor above our labs, and in a corner of the Manufacturing lab (machine shop). Disposing of the equipment that we use will prevent students from having those lab activities. Disposing of demonstration items and equipment examples we have means that we will have to go back to only having a textbook and/or an Internet video to take the place of items that students can work with in person. Disposing of the large stock of supplies for building new equipment, demonstration items, and repairing existing items means throwing away tens of thousands of dollars of parts and materials we have obtained over a period of years.**

**We have been fortunate to have received hundreds of thousands of dollars of grants and business donations (cash and items) of training equipment to give our students an exemplary lab experience. The opportunities for students that these resources provide should not be limited because we do not have space in order to house those resources when they are not immediately needed. Having to make a choice to not take advantage of the significant financial investments that can be made because of a lack of storage space is like a person having to decline the offer of a free vehicle (that is very expensive) because of that person does not have room in his/her garage! We are at the point of refusing to utilize grants and donations because we lack storage space.**

C. Technology and Equipment:

1. Understanding that some programs teach in multiple classrooms, how has new, repurposed or existing technology or equipment affected your program in the past year as it relates to student success?

**This summer, we were able to replace the computers in the Computer Integrated Manufacturing (CIM) lab, which was necessary because the automation equipment in the lab was updated in order to run the latest version of automation software need for programming it. With the new software, the older computers in the lab were not compatible any more. Not only can we run the new software and utilize the new automation equipment, our lab infrastructure was also updated to allow for advanced coursework incorporated in our lower-division advanced programmable controllers and CIM class, and a new upper-division Automation Networks course.**

**Our new lab in the S&E building also received a full complement of new computers, A/V equipment, and IT infrastructure allowing us to operate a number of industry-grade automated robotics systems. Not only does this support our Baccalaureate program, the robotics equipment connects our Engineering program directly to the efforts at Cal State Bakersfield and their Engineering program.**

**In addition to the industrial robotics equipment, we were able to spend several hundreds of thousands of dollars on equipment for our lower-division and upper-division courses in the areas of CIM, instrumentation and process control, motion control, automated systems, and automation networks. A combination of state and federal grants, funds for the implementation of Bachelor’s degree programs, and private donations (namely from Chevron) allowed us to make the non-computer equipment purchases.**

**There are numerous additional pieces of equipment that we will be able to purchase this semester through VTEA, Prop. 39, CCPT-2, STEM, and the Bachelor’s start-up funding, further benefiting our students.**

1. How will your new or repurposed classroom, office technology and/or equipment request contribute to student success?
* **Lower-division course improvements: In order to sufficiently prepare students for employment in these highly technical and constantly changing industry sectors, and to give them the best opportunity for employment, we will need to add new equipment as well as replace older, obsolete equipment on a regular basis. Our requests help to accomplish these goals.**
* **Baccalaureate course improvements: We are in the position of having to develop a brand-new instructional program that operates on an upper-division level of intellectual pursuit. Equipment needs to be more specialized and able to be used for lab activities that are more in line with what a “technologist” would perform as part of their daily work routine.**
1. Discuss the effectiveness of technology used in your area to meet college strategic goals.
* **VTEA Core Indicator improvements: For the “skill attainment” and “employment” core indicators, having proper and sufficient hands-on lab equipment and the instructional technology necessary to perform those lab activities is essential.**
* **Student learning: Most of the students in our programs learn best with hands-on learning activities as a supplement to lecture/demonstration instructional method.**
* **Student progression and completion: Well-developed and relevant lab activities are motivating factors in holding students interests and showing them the relevancy of course objectives to the actual employment environments in which they will eventually work once they have completed the program.**

D. Budget: Explain how your budget justifications will contribute to increased student success for your program.

**We have not requested any increase to our department, since we will defer to our Department Chair to make that request if needed. Our department has its own instructional budget that covers the various programs/disciplines within it.**

**VII. Faculty and Staff Engagement:**

1. Discuss how program members have engaged in institutional efforts such as college committees, presentations, and departmental activities.

**Our program faculty members have been deeply involved in the planning and implementation of the Industrial Automation Bachelor’s of Science degree which has consumed our work time to the point where we cannot be involved in committee work or projects not directly involved with the Bachelor’s degree work and our obligations to our students. As explained elsewhere in this document, the baccalaureate work has been significant, and as a result we feel each faculty member in this program has put in far more time than the average College faculty member who is not tasked with significant responsibilities.**

1. Instruction Only: Discuss how adjunct faculty are included in departmental training, discussions and decision-making.

**Adjunct instructors are on the list serve of the EIT Department Chair, and are invited to all department meetings. Additionally, they are included in general communications about the department and its activities.**

**In our program, especially this year, we have three new adjuncts teaching our Basic Electronics course. One of our faculty members is directly responsible for working with the adjuncts before the semester starts (getting them curriculum, materials, and training them on how to use the lab equipment), and communicates regularly with them throughout the semester. Several of the new adjuncts have actually sat through the faculty member’s Basic Electronics course (one has viewed almost all of the instructional days), and they have also gone through the lab activities with this faculty member outside of class time.**

**You will notice that adjunct communications and inclusion has been added to one of our program goals for the next three years. With a combination of both long-term, experienced adjuncts and brand-new adjuncts, we admittedly have been in a pattern of focusing most on the first couple of semesters an adjunct is teaching, and the more experienced ones get less contact. However, since each of our courses have specific equipment and lab activities that change regularly, communication between an adjunct and the full-time faculty member teaching the same course naturally takes place on a regular basis. We do recognize the need to create a more formal, scheduled interaction with our adjuncts.**

**One of the things that is important to note about our program is that we have relied upon our adjuncts to guide us with lab activities development, choosing new technology, support and information regarding equipment and technology, and similar opportunities for involvement. Our adjuncts are all working professionals who have a greater exposure to changing technology than we do. In fact, one of our courses was developed by a faculty member who was working for us as an adjunct at that time, and several of our adjuncts provided advice and expertise in planning some of the advanced technical classes that are part of our Baccalaureate program. We regularly utilize our adjuncts to shape the courses they teach, particularly in the advanced-level courses. While it has been helpful for our Basic Electronics adjuncts to be given the full complement of lecture presentations, written materials, and lab activities, we certainly do not tell our adjuncts that they will simply deliver instruction as if they are given a lock-step package.**

**We anticipate the difference between prior practice and how we want to work with them from now on is simply to transition from an informal, as-needed discussion to something that is regular and more intentional.**

**VIII. Conclusions and Findings:**

Present any conclusions and findings about the program. This is an opportunity to provide a brief abstract/synopsis of your program’s current circumstances and needs.

**The Electronics Technology program at BC, in addition to the Industrial Automation Baccalaureate program, has experienced a time of unprecedented growth. In order to adequately manage that growth and implement the new Baccalaureate program, the College will need to be more pro-active in maintaining a fair and equitable working environment for faculty, to continue to invest in equipment, facilities, and infrastructure, to pro-actively manage course sections expansion outside of the main campus, and to scale-up support services in line with the increase in enrollments.**

**Our program has significant strengths that have been at the forefront of fueling the record growth, and has challenges particularly with the rigid resource allocation structure and inflexible policies that create roadblocks to addressing the actual needs of instructional programs in a period of exceptional and unprecedented circumstances. We remain committed to effective student learning and employment placement as we seek to create a more equitable working environment for program faculty members.**