

Bakersfield College

Program Review – Annual Update 2015

I. Program Information:

Program Name: Industrial Drawing

Program Type: 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:

Career Technical Education (CTE) is one of the stated missions of the California Community College system. All types of construction, manufacturing, production, and engineering use drawings to communicate ideas through graphic communication. This Drafting and CAD program introduces the student to common conventions in the field and develops indispensable skills in:

- basic sketching and drafting techniques used every day by all levels drafters, designers, and engineers
- creating graphic solutions appropriate for the type of work being performed
- employing principles of design with an understanding of manufacturing processes
- increasing productivity through effective use of computer aided drafting (CAD)

Some classes are industry specific and give advanced instruction in 3D modeling, geographic information systems (GIS), electrical design, and piping drafting. Industrial drawing classes benefit students pursuing careers in engineering, architecture, and industrial technology. Students who receive training in our classes are prepared to enter various fields of employment, including AutoCAD drafter/designer, engineering technician, GIS technician, civil drafter, piping drafter, electrical circuits drafter, and 3D modeling designer. 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 (through 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. 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 Engineering and Industrial Technology (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. We provide relevant course and lab work geared toward full and part time 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.

II. Progress on Program Goals:

A. 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 (2) goals, please duplicate this section.

Program Goal	Which institutional goals from the Bakersfield College Strategic Plan will be advanced upon completion of this goal? (select all that apply)	Progress on goal achievement (choose one)	Comments
<p>1. Continue to coordinate with local industry through the work of advisory boards and other collaborative efforts. [Continued goal from last year. Changes in curriculum were either made or proposed in response to feedback by advisory committee. Evaluation of the change will take place over the next several years]</p>	<p><input checked="" type="checkbox"/> 1: Student Learning <input type="checkbox"/> 2: Student Progression and Completion <input type="checkbox"/> 3: Facilities <input checked="" type="checkbox"/> 4: Oversight and Accountability <input checked="" type="checkbox"/> 5: Leadership and Engagement</p>	<p><input type="checkbox"/> Completed: _____ (Date) <input type="checkbox"/> Revised: _____ (Date) <input checked="" type="checkbox"/> Ongoing: _____ (Date)</p>	<p>Our next advisory committee meeting is scheduled for this Fall. We will continue to communicate with all parties and work to improve instruction, adapt to the changing workplace, and prepare students for employment and university.</p>
<p>2. Address gaps in core indicators (continued from previous years)</p>	<p><input checked="" type="checkbox"/> 1: Student Learning <input checked="" type="checkbox"/> 2: Student Progression and Completion <input type="checkbox"/> 3: Facilities <input checked="" type="checkbox"/> 4: Oversight and Accountability <input type="checkbox"/> 5: Leadership and Engagement</p>	<p><input type="checkbox"/> Completed: _____ (Date) <input type="checkbox"/> Revised: _____ (Date) <input checked="" type="checkbox"/> Ongoing: _____ (Date)</p>	<p>Darren Willis is the faculty advisor for the Women in Science and Engineering club and Klint Rigby is the advisor of the Bakersfield College Engineers club, both</p>

			<p>on the Bakersfield College campus.</p> <p>Both clubs encourage non-traditional students to take classes in this area and become engaged in non-traditional fields of employment. Activities that encourage participation by target populations include guest speakers, design competitions, field trips, and social gatherings. We also work with the MESA program and HOPES club, each with similar goals to those stated above. MESA enables educationally disadvantaged students to prepare for and graduate from a four-year college or university with a math-based degree in areas such as engineering, the sciences, computer science, and mathematics. HOPES is the Hispanic Organization Promoting Engineering and Science.</p>
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B. List new or revised goals (if applicable)

New/Replacement Program Goal	Which institutional goals will be advanced upon completion of this goal? (select all that apply)	Anticipated Results
<p>Implement a series of entry and exit assessments (including tests, interviews, or surveys) to help evaluate student preparedness in the following areas:</p> <ul style="list-style-type: none"> • Base knowledge for new students (introductory course only) • Retention from prerequisite courses • Identification of knowledge gaps or misunderstanding of concepts 	<input checked="" type="checkbox"/> 1: Student Learning <input checked="" type="checkbox"/> 2: Student Progression and Completion <input type="checkbox"/> 3: Facilities <input checked="" type="checkbox"/> 4: Oversight and Accountability <input type="checkbox"/> 5: Leadership and Engagement	<p>Presently, there are no assessment tools in place across the program. Through these activities we will be able to determine:</p> <ul style="list-style-type: none"> • Level of experience of incoming students • Level of student achievement of the SLOs from prerequisite courses • Student attainment of course learning objectives

		<ul style="list-style-type: none"> • Student attainment level of program goals
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III. Trend Data Analysis:

Highlight *any significant changes* in the following metrics and discuss what such changes mean to your program.

A. Changes in student demographics (gender, age and ethnicity).

None

B. Changes in enrollment (headcount, sections, course enrollment and productivity).

We offered an additional section of INDR B12 on Saturday with minimal impact to overall headcount. According to the CTE Perkins IV information for Drafting Technology, enrollment and productivity have remained about the same for the 2014-2015 and 2015-2016 years:

	2013-2014	2014-2015	2015-2016
Cohort Year CTE Enrollments:	620	582	571
CTE Headcount	408	398	369

We are in need of further sections, especially in the areas of Civil/GIS drafting (INDR 52) and Process Piping (INDR 50)

C. Success and retention for face-to-face, as well as online/distance courses.

Success rates have not seen significant changes for this program.

D. Changes in the achievement gap and disproportionate impact (Equity).

None.

E. Other program-specific data that reflects significant changes (*please specify or attach*). All Student Affairs and Administrative Services should respond.

None.

IV. Program Assessment (focus on most recent year):

A. How did your outcomes assessment results inform your program planning? Use bullet points to organize your response.

We are still struggling to help our students in the core indicator areas of:

- Skill attainment
- Persistence and transfer
- Non-traditional participation
- Non-traditional completion

We have made improvements in total completions and employment.

One of our roadblocks is that all sections of drafting technology classes are full and have waitlists. Additionally, instructor loads and laboratory availability during traditional teaching times are maximized. We cannot serve more students at this time.

Changes we have made to help address these problems:

- We are planning marketing days on campus (to coincide with registration dates) to make our program more visible to students in our core indicators. These events include:
 - Setting up informational displays and tables in high-traffic areas on campus – staffed by professors and current students
 - Having hands-on and demonstrative activities for students to catch their attention
 - Encouraging students who typify the core indicators to get involved in our classes
- We have hired two additional adjunct faculty and are offering classes on Fridays and Saturdays in addition to the normal Monday through Thursday classes
- We are exploring the possibility of offering classes in other computer labs on campus
- Because the computer labs closest to the Math Science building are experiencing similar scheduling issues we have not yet found a solution. Adding computers to the manual drafting lab (MS 12) may help alleviate this problem
- We would like to add another computer lab

The school is also offering a new Bachelor’s degree program beginning in the fall of 2017. This new degree will require two additional classes to be taught in the Drafting / CAD computer labs. This will further impact planning, scheduling, and staff loads. In order to help solve these problems, we hope to continue to hire adjunct or full-time faculty and garner additional computer lab resources.

Input from our advisory board emphasizes the need for advanced level classes to meet their employment needs. For example, we now offer entry-level classes in piping and civil drafting classes, but the workers who fill these positions quickly need second- or third-level skill to maintain productivity. Possible solutions include:

- Installing new, industry-standard software not currently used on campus
- Sending existing faculty for training in these programs
- Hiring additional adjunct faculty with practical experience who are qualified to teach these classes
- Offering contract education classes outside of the traditional teaching schedule

Additionally, we would like to better serve our community in some of the technical training we do. For example, we have what we refer to as our “Creative Design Center,” which is a resource for our students (and the community) to come to BC and use our laser engraver and our two 3D printers. The current space used for the Creative Design Center is a small storage room that is crowded with machines and computers. When any more than 3 students are in the room it becomes difficult to work. Instruction in the room is not feasible. While the number of students who are using this center is expanding, we have discussed inviting the public at large to intensive workshops; this could also lead to reaching segments of the community who have to travel out of the immediate area for training and experience.

There is currently a need in the MS12 classroom where Industrial Drawing and Architecture classes are held for an improved projection system. The current short-throw projector produces a small image that would be adequate in a classroom with traditional seating (15 square feet); however, the MS12 lab has four rows of high drawing tables, making the images projected too small for students to see clearly, especially at the extreme edges of the class. There are also issues related to the Ladibug document cameras and the switching system; either the computer desktop OR the document camera can be projected at any one time, but not simultaneously.

Our proposal to fix this is multi-layered, depending on available resources.

- 1) A larger image can be achieved by replacing the existing short-throw projector with a ceiling-mounted projector, and rather than using the whiteboard as the projection surface (which currently only allows for a 5'x3' image), a standard roll-up screen, such as the one found in MS10 and MS9 (6'tall, 7'-9" wide, almost 48 square feet) would be used.
- 2) The best option for this classroom, where instruction in mechanical drawing and is done, would be the inclusion of a dedicated system that projects the document camera independent of the computer screen. Our department current has a single Epson projector. If another Epson projector could be acquired (or, two newer, smaller projectors could be purchased), dual images of the document camera display (one on either side of the projected computer-screen) would be visible to students on both sides of the classroom.

B. How did your outcomes assessment results inform your resource requests? The results should support and justify resource requests.

We are requesting the most pressing needs:

- Hiring additional faculty – this will allow us to expand the amount of time available to teach classes (including Fridays and Saturdays)
- Providing training for faculty – to better meet the needs of the local economy and the students who wish to fill new job opportunities
- Requesting a new computer lab – allowing us the ability to offer more sections and touch more students
- Requesting a new space for our Creative Design Center that will increase its visibility and access for more students

C. How do course level student learning outcomes align with program learning outcomes? Instructional programs can combine questions C and D for one response (SLO/PLO/ILO).

The Program Learning Outcomes for Industrial Drawing are listed below:

1. Students will demonstrate proficiency in the technical skills required for employment in drafting/CAD related industries.
2. Students will demonstrate problem solving skills used in industrial design and product development required for drafting/CAD related positions.
3. Students will demonstrate a deep understanding of the core material required for certification in drafting/CAD.

Our course level student learning outcomes were developed with the program learning outcomes and the institutional learning outcomes in mind. The course level outcomes generally focus on learning outcomes that help to develop balanced students who recognize the way each course fits into the program and the overall educational experience.

D. How do the program learning outcomes or Administrative Unit Outcomes align with Institutional Learning Outcomes? All Student Affairs and Administrative Services should respond.

Institutional Learning Outcomes:

Think: Think critically and evaluate sources and information for validity and usefulness.

Communicate: Communicate effectively in both written and oral forms.

Demonstrate: Demonstrate competency in a field of knowledge or with job-related skills.

Engage: Engage productively in all levels of society – interpersonal, community, the state and the nation, and the world.

E. Describe *any significant changes* in your program's strengths since last year.

- We hired a student to work in the Creative design center. That student has been instrumental in maintaining the center, working with students and teachers from the drafting, CAD and architecture areas, and instructing students who come in to utilize the center. Her assistance has allowed the faculty to concentrate on education rather than operating the machines.
- We would like to purchase another 3D printer that has the capability to print in more than one material. The current technology in the CDC allows us to print in one material only. While overall proof-of-concept can be demonstrated, a printer that allows us to print in many materials will enhance this process tremendously because we will be able to print in colored plastic, clear plastic, and even rubberized plastic. This is the next logical development in the CDC.
- We had three instructors working with MESA Week Zero, helping to create small learning communities for our Science, Technology, Engineering, and Mathematics (STEM) students and enhance success.
- We replaced the computers in MS9 and MS10 with new computers, including dual monitor setups (an industry standard) and are in the process of installing new software.

F. Describe *any significant changes* in your program's weaknesses since last year.

- We continue to struggle with working in classes after giving up availability of MS 3-4 (one of our drafting labs) to mathematics. This has resulted in impacting our remaining drafting lab (MS 12) with very little time to move classes around. We have to be very careful when scheduling classes to ensure that all of our obligations are met while still allowing for open lab availability for students. We are not able to add additional classes unless we offer them at nontraditional times, such as Friday or Saturday classes.

G. If applicable, describe any unplanned events that affected your program.

The approval of the new Bachelor's degree last year has created problems that we could not have foreseen. The largest problems have been discussed above, but include:

- Lack of sufficient lab space
- Lack of faculty to teach the existing and proposed courses
- Lack of training in new software

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

A. Human Resources and Professional Development:

1. 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.

Drafting technology is not requesting any additional full time positions – we are only requesting that new adjunct faculty be hired to fill existing needs as stated above.

2. Professional Development:

- a. 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.

Each year we send two of our faculty to Autodesk University, the premier training event the products we teach. At the event, our faculty receive the following benefits:

- We explore new tools and technologies, plus get insider tips and tricks
- Network with peers, partners, expert speakers, and Autodesk product teams
- Learn new skills which we share with my colleagues
- Take free Autodesk certification exams – Last year each attendee took and passed expert-level exams

Our local community has come to rely on Bakersfield College to provide industry with well-trained employees. Autodesk University is one way that we continue to stay on the leading edge of new technology, training, and certification. Additionally, the importance of networking must be stressed. The connections we make benefit faculty and students.

- b. What professional development opportunities and contributions can your program make to the college in the future?

Our program has plans to expand the use of the Creative Design Center through faculty training during flex week. The last flex we offered had approximately 20 attendees. The technology we employ in the Creative Design Center can be leveraged to improve education in all areas across the campus.

B. Facilities:

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

Our area has not had any significant changes in facilities in the past year.

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

Our main request this year is for additional space for teaching (CAD lab) and to expand the creative design center. As stated above, the labs are maximized for instruction at this point, making adding additional classes very difficult. By adding one more computer lab dedicated to drafting technology, we could potentially reach an additional 50 percent more students.

The creative design center is a very small room that presently hosts two 3D printers, a laser engraver, two computers, and two large work tables. There is no space for instruction. The ideal arrangement for the creative design center would have a classroom-sized facility that could be opened to the campus and community as a true resource. Bakersfield has no place like this at this point. Ideally, we would like to open a facility similar to Makerspace (www.spaces.makerspace.com), Vocademy (www.vocademy.com), or Tech Shop (www.techshop.ws). The closest resources are Makerspaces located in Fresno or Pasadena.

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?
 - The computer labs just received new, up-to-date computer labs with dual monitors, which is industry standard for our area.
 - Autodesk, the publisher of AutoCAD, REVIT, and Autodesk Inventor, have made the software free to our institution and all of our students.
2. How will your new or repurposed classroom, office technology and/or equipment request contribute to student success?

We plan on converting all of our lab manuals and class packs to digital format, which will allow students to access our information, complete with hypertext links to additional resources. This change will allow students to display learning information on one screen while employing the programs we teach on the other screen. Student will have additional access to information and learning resources while in the lab. The result will not only increase productivity, but also save the students and school money on reproduction costs.

Allowing our students free access to the latest software is a huge benefit for our program and community. Students are able to download and install software used in businesses across the state, country, and around the world for free – saving them thousands of dollars. The software that they download is the exact same software used by professionals – not a watered-down free version. This contributes to student success because most of our students are now able to practice at home and access extended learning activities that were previously prohibited due to time constraints in the computer lab.

3. Discuss the effectiveness of technology used in your area to meet college strategic goals.

Our classes are technology driven. Students and local employers count on Bakersfield College to have the latest software and training opportunities. The use of technology in our classes has the following goals:

- To provide a holistic education that develops curiosity, inquiry, and empowered learners.
- The free software and computer resources in the computer resource center help to eliminate barriers that cause students difficulties in reaching their educational goals.
- To commit to providing the best resources for our students, including computers, software, plotters, 3D plotters, lasers, scanners, and related devices as well as the best facilities possible.
- To link the content and coursework with realistic goals, techniques, and processes used in industry, in an effort to ensure that the education provided is relevant and immediately applicable to industry and employment.

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

VI. 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 Drafting and CAD program at Bakersfield College is strong, but struggling to meet the demands of our students because of a lack of lab space and faculty. If some changes are not made to the availability of lab space, the addition of the new degree will negatively affect the program as a whole. Overall, we can make the following conclusions:

1. Increasing the number of classes we offer will lead to increased numbers of Job Skills Certificates awarded to our students. We have added an additional section of INDR 20b for the Spring semester which will increase completions for students in this area, but many students still have to wait to take other classes such as the Civil Drafting and Piping classes.
2. The Creative Design Center has increased our visibility on campus and in the community. We hope to expand our space and tools to better reach the community. The introduction of 3D printing and the laser technology into our classes has increased excitement in our program and gives students hands-on experience with this technology that was not previously available. We believe that it will lead to equipping our students to enter the workforce and be productive at a sooner rate. Students are using this technology in many classes, including Industrial Drawing, Architecture, and Engineering classes.
3. Introducing Friday and Saturday courses in the area has had some positive effects on scheduling and availability. We will continue to explore these areas and make changes for future sections.
4. Our success and retention rates are greater than the College average. We will continue to look for ways to increase our numbers in both of these areas.

VII. Forms Checklist (place a checkmark beside the forms listed below that are submitted as part of the Annual Update):

- Best Practices Form **(Required)**
- Curricular Review Form **(Instructional Programs Required)**
- Certificate Form **(CTE Programs Required)**

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- Faculty Request Form
 - Classified Request Form
 - Budget Form
 - Professional Development Form
 - ISIT Form
 - Facilities Form (Includes Equipment)

Other: _____