**Bakersfield College**

**Comprehensive Program Review**

**I. Program Information:**

Program Name:

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:

The Manufacturing Technology program at Bakersfield College provides training in the use of machine tools for production. Students learn the proper and safe use of lathes, milling machines, drilling machines, band saws, grinders, and measurement tools in cutting operations to produce precision parts from metal stock. Training is provided in the use of manually controlled machine tools as well as computer numerical control, or CNC, machine tools. The courses are designed to meet the training needs of local industry. The most significant local industries utilizing machinists include the petroleum, agriculture, and aerospace. Students enrolling in the Manufacturing Technology courses include students majoring in manufacturing, welding, electronics, and engineering. There are three course under the title “Manufacturing Technology”: MFGT B1AB “Machine Tool Processes”, MFGT B2 “CNC Lathe Programming”, and MFGT B3 “CNC Milling Machine Programming”. Student can find gainful employment after (or even while) taking any one of these courses, whether or not they complete the entire degree or certificate of achievement.

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. 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.

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| --- |
| ***Instructional Programs only:***   1. List the degrees and Certificates of Achievement the program offers   AS Industrial Technology, Manufacturing Option  CA Manufacturing Technology   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. 2. If your program offers a local degree in addition to the ADT degree, please explain the rationale for offering both. |

**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.

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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. Updating program outcomes to be specific and measureable to enable program planning based on assessment results. | 1: Student Learning  2: Student Progression and Completion  3: Facilities  4: Oversight and Accountability  5: Leadership and Engagement | Completed: \_\_\_\_\_\_\_\_\_\_ (Date)  Revised: \_\_\_\_\_\_\_\_\_\_ (Date)  Ongoing: \_\_Fall 2016\_ (Date) |  |
| 2. Continue to address gaps in  CTE core indicators. | 1: Student Learning  2: Student Progression and Completion  3: Facilities  4: Oversight and Accountability  5: Leadership and Engagement | Completed: \_\_\_\_\_\_\_\_\_\_ (Date)  Revised: \_\_\_\_\_\_\_\_\_\_ (Date)  Ongoing: \_\_Fall 2016\_ (Date) |  |

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.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **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. Develop additional, more advanced manufacturing courses in manual machining and CNC machining. | 1: Student Learning  2: Student Progression and Completion  3: Facilities  4: Oversight and Accountability  5: Leadership and Engagement | Rebuild manufacturing technology advisory committee to direct curriculum development. |  | Jason Dixon - Department Chair |
| 2. Develop a larger pool of adjunct instructors | 1: Student Learning  2: Student Progression and Completion  3: Facilities  4: Oversight and Accountability  5: Leadership and Engagement | Additional instructors will be needed in order for the program to grow. |  | Jason Dixon - Department Chair |

**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).

Gender: The percentage of female students has declined over the past three years – 10% in 2013-14, 6% in 2014-15, and 2% in 2015-16. The percentages were 8% in 2011-12 and 4% in 2012-13, years with higher enrollments. The possible reasons for this are unclear, however, efforts will be made to increase the percentage of female students.

Age and Ethnicity: The percentages for these two areas very closely follow the college-wide statistics.

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

Headcount: The unduplicated headcount increased from 72 in 2013-14 to 101 in 2015-16. The program is seeing enrollments that could grow to levels not seen since 2011-12.

Sections: Six class sections were offered in 2014‐15, up from four during the previous two years. This was a result of hiring the additional adjunct instructor who taught fall, spring, and summer morning class sections.

Course Enrollment: First day enrollment has increased from 80 in 2013-14 to 113 in 2015-16. During this period the students per section remained relatively steady at 20, 21, and 19, indicating consistent demand for classes in manufacturing technology.

Productivity: FTEF/FTES has increased steadily from 10.9 in 2014-15 to 12.3 in 2015-16. The first adjunct instructor was hired in 2014-15 and a second in 2015-16. These adjunct instructors supplement as the full-time manufacturing instructor, who is also the EIT department chair, provided instructional support in other areas of the EIT department.

1. Changes in achievement gap and disproportionate impact.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Retention | | | Success | | |
| Ethnic Group | MFGT | BC | ∆ (MFGT-BC) | MFGT | BC | ∆ (MFGT-BC) |
| African American | 75% | 75% | 0% | 67% | 51% | +17% |
| Asian/Filipino/Pacific Islander | 100% | 89% | +11% | 100% | 65% | +35% |
| Hispanic/Latino | 82% | 85% | -3% | 76% | 66% | +10% |
| Two or More Races | 79% | 83% | -4% | 68% | 83% | -17% |
| White | 84% | 88% | -4% | 78% | 75% | +3% |

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2013-14** | | | **2014-15** | | | **2015-16** | | | **Overall** | | |
|  | MFGT | BC | MFGT | MFGT | BC | ∆ (MFGT-BC) | MFGT | BC | ∆ (MFGT-BC) | MFGT | BC | ∆ (MFGT-BC) |
| Retention | 88% | 87% | 88% | 83% | 88% | -4% | 88% | 88% | 0% | 83% | 85% | -2% |
| Success | 82% | 70% | 69% | 69% | 69% | +9% | 69% | 71% | +2 | 76% | 68% | +8% |

1. Degrees and certificates awarded (three-year trend data for each degree and/or certificate awarded).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **2013-14** | **2014-15** | **2015-16** | **Overall** |
| Job Skills Certificate  Basic Machine Tool Operations – Lathe, Mill | 33 | 12 | 32 | 77 |
| Job Skills Certificate – CNC Programming | 7 | 6 | 0 | 13 |
| AS Degree – Industrial Technology Manuf. Option | 0 | 0 | 0 | 0 |
|  |  |  |  | 90 |

The strength of the manufacturing technology program is in the certificates that are awarded. Those numbers dipped slightly in 2015-16, however, due to course offerings being limited by the number of hours that adjunct instructors can teach. A curriculum change in the number of hours for MFGT B1AB – from 6 hours per week to 5 hours per week - was approved last year. Each adjunct is now able to teach two class sections per week.

1. Other program-specific data (please specify or attach).
2. List degrees and certificates awarded (three-year trend data for each degree and certificate awarded). Include targets (goal numbers) for the next three years.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Full Name of Degree or Certificate | 2011- 2012 | 2012- 2013 | 2013- 2014 | 2014- 2015 | 2015- 2016 | 2016- 2017 |
| Job Skills Certificate  Basic Machine Tool Operations – Lathe, Mill | 60 | 70 | 33 | 12 | 32 | 40 |
| Job Skills Certificate – CNC Programming | 14 | 7 | 7 | 6 | 0 | 10 |
| AS Degree – Industrial Technology Manuf. Option | 0 | 0 | 0 | 0 | 0 | 1 |
| AS Degree - Control Systems Technology | 1 | 0 | 0 | 0 | 0 | 1 |

**IV. Program Assessment:**

Use attached **Assessment Report Form Comprehensive Tab**

1. Discuss your program’s strengths.

* The manufacturing technology program provides hands-on experience in the use of machine tools to a broad spectrum of students: machinist and metal fabrication trainees, engineering students, professional development students, and avocational students.
* EMSI projects a 9.3% increase in manufacturing-related jobs in the 2016-21 period at a rate of 50 jobs annually indicating strong growth potential for job placement from this program. Call-PASS-Plus LaunchBoard is projecting 127 new manufacturing jobs annually between now and 2019.

1. Discuss your program’s weaknesses.

* There are currently only 3 courses specific to the manufacturing technology program, however, students in the past few years have asked for the development of additional courses in the MFGT discipline. Additional courses would improve the preparedness of students to enter the workforce with higher skill levels.

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

In 2014 the sole full-time instructor for the manufacturing technology program was nominated and subsequently elected as chair of the Engineering and Industrial Technology Department. This position carries 0.7 release time in a department with nine individual disciplines, each with its own certificates and degrees. Additionally, each program has its own specific strategic planning taking place to coordinate with needs of each specific industry. Due to the complexity of the EIT department, two adjunct instructors were hired to maintain manufacturing course offerings, each with decades of industry experience as machinists. The program, however, needs full-time leadership, especially to be able to meet the growth potential identified by EMSI.

**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.

* Section VII below lists the occupations that the manufacturing technology program trains for and projected growth in those careers. A full-time instructor to provide leadership for the program in order to build instructional capacity to meet the projected labor market demand, develop curriculum, and engage the community. The program utilizes multiple pieces of complex equipment and a wide spectrum of tools, all of which requires constant management in order to maintain a safe and productive environment for students. Two adjunct instructors are utilized to teach the courses as the full-time instructor serves as faculty chair of the Engineering and Industrial Technology department. This a position has 0.7 release time to provide support to nine individual programs, with a tenth program in Occupational Safety and Risk Management in development. The chair has also been closely involved with the development of the new baccalaureate degree program.
* The work of the EIT maintenance technician, Tom Moehnke, has been essential in the continuity of the manufacturing program and to the success of our students. His expertise in solving problems with equipment and fabrication of classroom equipment saves the department countless hours that could not be utilized in the preparation and execution of teaching. He announced his intention to retire at the end of fall 2016 and his replacement is necessary to minimize the downtime of any equipment in the labs utilized by the EIT faculty and students.

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.

For reasons detailed above the primary focus of the manufacturing program has been to maintain the scheduling and offering classes taught by adjunct instructors.

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

At some point in the future, Flex workshops could be conducted to educate the BC community regarding the importance of manufacturing to the local community and to society.

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

No maintenance, repair, or updating was conducted within the past three years.

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

A facilities request is being made to repurpose a now-underutilized tool storage room into office space to help alleviate a shortage of office space in the Industrial Technology building. This will help provide student access to instructors during office hours and facilitate growth in the EIT department.

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?

None was requested in the past three years.

1. How will your new or repurposed classroom, office technology and/or equipment request contribute to student success?
2. Discuss the effectiveness of technology used in your area to meet college strategic goals.

Computers in room IT 205 are utilized for in-class CNC training in conjunction with the Haas CNC Control Simulators.

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

No budget increases are being requested specifically for the manufacturing technology program.

**VII. Faculty and Staff Engagement:**

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

The full-time instructor for the manufacturing program represents the Engineering and Industrial Technology department at the Faculty Chairs and Directors Council and has been closely involved with the development of the baccalaureate degree in industrial automation. The other manufacturing instructors are adjunct and do not participate in committees.

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

The adjunct instructors for the manufacturing technology program each have decades of experience in machining and are consulted for curricular decisions for the program.

**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 manufacturing technology program finds itself at a point where growth could occur with the proper alignment of resources. According to EMSI and the Cal-PASS-Plus LaunchBoard, Kern is poised to for growth in manufacturing-related jobs. The program should be prepared for this growth. A full-time faculty member whose focus is machining should be assigned in order to provide leadership in meeting this challenge. Below is a chart from the EMSI listing manufacturing-related occupations and employment projections in Kern County:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Occupation | 2016 Jobs | Annual Openings | Median Hourly Earnings | Growth (2016 - 2021) |
| Machinists | 510 | 28 | $18.48 | 11.57% |
| Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic | 103 | 2 | $12.12 | 2.91% |
| Mechanical Engineering Technicians | 87 | 4 | $31.21 | 11.49% |
| Mechanical Drafters | 63 | 2 | $26.63 | 6.35% |
| Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic | 63 | 4 | $14.60 | 15.87% |
| Computer-Controlled Machine Tool Operators, Metal and Plastic | 59 | 5 | $25.90 | 23.73% |
| Structural Metal Fabricators and Fitters | 50 | 2 | $15.16 | 14.00% |
| Metal Workers and Plastic Workers, All Other | 49 | 1 | $15.71 | (2.04%) |
| Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic | 41 | 2 | $16.91 | 7.32% |
| Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic | 40 | 1 | $18.68 | (12.50%) |
| Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic | 34 | 1 | $17.42 | 2.94% |
| Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic | 34 | 1 | $16.32 | 11.76% |
| Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic | 23 | 2 | $26.09 | 17.39% |
| Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic | 21 | 0 | $18.07 | 0.00% |
| Tool and Die Makers | 19 | 1 | $25.18 | 10.53% |
| Rolling Machine Setters, Operators, and Tenders, Metal and Plastic | 16 | 0 | $17.12 | 0.00% |
| Tool Grinders, Filers, and Sharpeners | 13 | 0 | $16.65 | 7.69% |
| Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic | 11 | 0 | $16.14 | 9.09% |

Below is a chart from the Cal-PASS Plus LaunchBoard listing manufacturing-related occupations and employment projections in Kern County:

