**Bakersfield College**

**Program Review – Annual Update**

**I. Program Information:**

Program Name: Manufacturing Technology

Program Type:  Instructional  Non-Instructional

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.

Program Description: 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.

According to labor statistics provided by the California Employment Development Department there are an estimated 520 machinists employed in Kern County and that number is projected to grow to 560 by the year 2020 (source: <http://goo.gl/5p93zk> ). This same webpage lists 866 Kern County businesses that employ machinists, indicating a likelihood that the employment figures may have been underestimated.

Despite the significant role of machining in Kern County industry, manufacturing technology is the probably the least well-known program in the EIT department. This most likely explanation is an issue of culture as most people are familiar with the technologies taught by the majority of the EIT department: architecture, automotive, welding, electronics, engineering, construction, industrial drawing/drafting, and woodworking/cabinetmaking. During the 1960’s through the early 1990’s there were multiple levels of machining taught at Bakersfield College to full course sections. A generation ago the general public as most had taken a semester of metal shop in junior high school and understood the role of the machinist. Currently, very few have had this experience and, as a result, very few young people know of the career possibilities in the field of manufacturing.

The faculty of this program plan to work closely with the office of Career and Technical Education to better utilize its resources to market the program to students seeking careers. The 2014-15 goals of the CTE office for the manufacturing technology program are to increase nontraditional participation and completion rates and help expand of the program.

**II. Program Assessment (focus on most recent year):**

1. How did your outcomes assessment results inform your program planning?

The most recent outcome assessed dealt with students demonstrating problem-solving skills in industrial design and product development, an area in which machinists are often involved. Knowledge of machining skills is a required course for mechanical engineering students and industrial drawing students. The work of a machinist is to study a blueprint and determine the processes needed to produce that part, with specifications to thousandths of an inch. It was determined through the assessment that this area of the courses needed improvement. A new textbook was selected for the MFGT B1AB course that provides thorough instruction in blueprint reading skills essential for entry-level machinists. This new textbook is also the first new title published in several decades and uses a modern pedagogical approach instead of course content taught “the way it’s always been taught”.

1. How did your outcomes assessment results inform your resource requests?

No new resources have been requested

1. Instructional Programs only**:** How do course level student learning outcomes align with program learning outcomes?

The student learning outcomes for each course in the program satisfy at least one of the program learning outcomes. In several cases the courses satisfy all three PLO’s.

1. How do the program learning outcomes align with Institutional Learning Outcomes?

|  |  |
| --- | --- |
| **ILO** | **PLO** |
| **Think Critically** | Students will demonstrate problem-solving skills used in manufacturing design |
| **Demonstrate Competency** | Students will demonstrate technical proficiency and safety knowledge |
| **Communicate Effectively** | Students will demonstrate problem-solving skills and technical proficiency |
| **Engage Productively** | Students will demonstrate a deep understanding of requirements for university transfer or industry certification |

1. Describe *any significant changes* in your program’s strengths since last year.
2. Describe *any significant changes* in your program’s weaknesses since last year.

MFGT B1AB was offered only as a day class, which partially reduced the enrollments in MFGT B2 and B3, which was offered only as an evening class. There was no evening section of MFGT B1AB offered.

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

During the spring 2014 semester the EIT department chair announced that he would be stepping down from that position for various reasons. The sole instructor for the manufacturing technology program was nominated and subsequently elected as department chair for the 2014-15 year, a position carrying 0.6 release time in a department with nine individual disciplines, each with its own certificates and degrees.

The sole full-time instructor now meets minimum qualifications for engineering technology and may be called upon to teach courses common to engineering and engineering technology.

**III. Resource Analysis:**

1. Human Resources
2. If you are requesting any additional positions, explain briefly how the additional positions will contribute to increased student success.
3. Professional Development
4. Describe briefly the effectiveness of the professional development your program has been engaged with (either providing or attending) during the last cycle, focusing on how it contributed to student success.
5. Provide rationale for future professional development opportunities and contributions that your program can make.
6. Facilities (M&O requests can be submitted by completing the [M&O request form](https://committees.kccd.edu/sites/committees.kccd.edu/files/Copy%20of%2012%20M%26O%20Needs%20Workbook%2012-13%20APR.xlsx).)

Has your area received any facilities maintenance, repair or updating in this cycle? No.

1. If yes, how has the outcome contributed to student success?
2. If no, how will your facilities request contribute to student success?

Maintaining a safe work environment for students is of utmost importance. As such most, if not all, M&O work requests relate directly to student safety.

1. Technology (Technology requests can be made by filling out the [ISIT Request form](http://www.bakersfieldcollege.edu/irp/Annual%20Program%20Reviews/2012-13/13%20ISIT%20Priority%20Workbook%2012-13.xlsx).)
2. Has your program received new or repurposed technology in this cycle? No.
   1. If yes, how has this technology contributed to student success?
   2. If no, how will your new or repurposed technology request contribute to student success?
3. Do you need new or repurposed classroom technology to support student success and/or new office technology to support faculty/staff success? Justify your request.
4. Budget (Changes to the budget allocation can be requested using the [Budget Change Request Form](http://committees.kccd.edu/bc/committee/programreview)).

If you are requesting any additional funding, explain briefly how it will contribute to increased student success.

**IV. Trend Data Analysis:**

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

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

Gender: Last year 14% of students were female, compared to 4% in 2012-13. This reflects an increase of 5 female students. The College makeup by gender is 55% female, 45% male.

Age: 19 & Younger - 21%; 20-29 – 44%; 30-39 - 18%; 40 & Older - 17%

Ethnicity The statistics were almost identical to the College as a whole:

African-American 6%; American Indian 0%, Asian/Filipino/Pacific Islander 1%; Hispanic/Latino 61%, White 25%; Two or More Races 7%; Unknown 0%

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

The unduplicated headcount was down by 72 students (39%) in 4 total sections of courses (6 sections in most prior years). Course productivity was 16.0 FTES, down from 29.1 the previous year. FTEF was also down, measuring 1.5 last year versus 2.3 the year before. This was due to one less manufacturing course being offered.

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

The success and retention rates were 82% and 88%, respectively. These scores were college total success rate of 69% and retention rate of 86%.

1. Other program-specific data that reflects significant changes *(please specify or attach).*

**V. Progress on Program Goals:**

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 (2) goals, please duplicate this section.

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| --- | --- | --- | --- |
| **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**  **(if applicable)** |
| 1. Continue to coordinate with local industry through the work of advisory boards and other collaborative efforts | 1: Student Success  2: Communication  3: Facilities & Infrastructure  4: Oversight & Accountability  5: Integration  6: Professional Development | Completed:  \_\_\_\_\_\_\_\_\_\_ (Date)  Revised: \_\_\_\_\_\_\_\_\_\_ (Date)  Ongoing: \_\_\_\_\_\_\_\_\_\_ (Date) | Program faculty will be working with the CTE office to add advisory committee members that represent a more accurate cross-section of the Kern County manufacturing sector: petroleum, food/agriculture, aerospace, and industrial maintenance. |

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| **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**  **(if applicable)** |
| 1. Continue to address gaps in core indicators. | 1: Student Success  2: Communication  3: Facilities & Infrastructure  4: Oversight & Accountability  5: Integration  6: Professional Development | Completed:  \_\_\_\_\_\_\_\_\_\_ (Date)  Revised: \_\_\_\_\_\_\_\_\_\_ (Date)  Ongoing: \_\_\_\_\_\_\_\_\_\_ (Date) | Program faculty will be working with the CTE office to add advisory committee members that represent a more accurate cross-section of the Kern County manufacturing sector: petroleum, food/agriculture, aerospace, and industrial maintenance. |

1. New or revised goals (if applicable)

|  |  |  |
| --- | --- | --- |
| **New/Replacement Program Goal** | **Which institutional goals from the Bakersfield College Strategic Plan will be advanced upon completion of this goal? (select all that apply)** | **Anticipated Results** |
|  | 1: Student Success  2: Communication  3: Facilities & Infrastructure  4: Oversight & Accountability  5: Integration  6: Professional Development |  |

**VI. Curricular Review (Instructional Programs only):**

1. Review of Course Information:
   * Column A list all of the courses associated with the degree.
   * Column B list the Fall term the review process will be started for ongoing compliance.
   * Column C list the compliance due date.
   * Column D list any changes to courses with regard to distance education.
   * Column E list corresponding C-ID descriptors if available. <http://www.c-id.net/>

**\*\*Dates listed should reflect a five year cycle allowing for one year of review**

**to maintain ongoing compliance.\*\***

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| --- | --- | --- | --- | --- |
| **A. Course** | **B. Fall Term Review will be Submitted** | **C. Compliance Due Date** | **D. Distance Education Changes** | **E. C-ID Descriptors Available** |
| MFGT B1AB | 2016 | 2/1/2017 | NA | NA |
| MFGT B2 | 2016 | 2/1/2017 | NA | NA |
| MFGT B3 | 2016 | 2/1/2017 | NA | NA |
| MFGT B53 | Deleted 2014 | 5/1/2014 | NA | NA |
| TECM B52 | 2014 | 9/1/2009 | NA | NA |
| INDR B10 | 2018 | 1/1/2019 | NA | NA |
| INDR B11 | 2018 | 1/1/2019 | NA | NA |
| WELD B1A | 2016 | 1/1/2017 | NA | NA |
| WELD B1B | 2016 | 1/1/2017 | NA | NA |
| WELD B54A | 2017 | 4/1/2018 | NA | NA |
| MFGT B1AB | 2016 | 2/1/2017 | NA | NA |
| INDR B20A | 2018 | 1/1/2019 | NA | NA |
| INDR B40 | 2018 | 1/1/2019 | NA | NA |
| INDT B273 | 2014 | 11/1/2005 | NA | NA |
| WELD B74A | 2018 | 4/1/2018 | NA | NA |
| WELD B74B | 2018 | 4/1/2018 | NA | NA |

1. Review of Program Information:

Is the program information housed in CurricUNET accurate? (Considerations: changes in course(s) names and/or suffixes as well as additions/deletions of courses). If not, then a program modification needs to be started in CurricUNET to reflect the necessary changes. Explain the requested changes below.

INDR B10 and INDR B11 were combined into a single course called INDR B12. The MFGT degree and certificate of achievement need to be updated to reflect this change

Is the program and course listing information in the current catalog accurate? If not, list the requested

changes below. Catalog information should reflect what is in CurricUNET.

\_\_Delete INDR B10 and INDR B11. Add INDR B12\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Student Education Plan (SEP) Pathway(s) uploaded to “Attached Files” in CurricUNET.

If applicable, SEP Pathway with CSU Breadth indicated? Yes or No

If applicable, SEP Pathway with IGETC indicated? Yes or No

If applicable, SEP Pathway with BC General Education indicated? Yes or No

**\*\*Please ensure that the information housed in CurricUNET and the current catalog match. \*\***

1. If applicable, provide a description of the program’s future adoption of C-ID descriptors and Associate Degree for Transfer (ADT) or Model Curricula.

\_\_\_\_\_\_Not Applicable\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_

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**VII. Conclusions and Findings:**

Present any conclusions and findings about the program.

**VIII. Attachments (place a checkmark beside the forms listed below that are attached):**

[Faculty Request Form](http://committees.kccd.edu/bc/committee/programreview)  [Classified Request Form](http://committees.kccd.edu/bc/committee/programreview)  [Budget Change Request Form](http://committees.kccd.edu/bc/committee/programreview)

Professional Development  [ISIT Form](http://committees.kccd.edu/bc/committee/programreview)  [M & O Form](http://committees.kccd.edu/bc/committee/programreview)

[Best Practices Form](http://committees.kccd.edu/bc/committee/programreview) **(Required)**  Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**IX. Certificates of Achievement:**

Programs with stackable certificates fill out the following form.

Stand alone certificates fill out the entire Annual Update.

**Certificate Form**

**Annual Update 2014-15**

**Name of Program:** \_\_Manufacturing Technology\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Certificate Name** | **JSC** | **CA** | **Is the certificate stackable?** | **Is the certificate a**  **stand alone program?** |
| Basic Machine Tool Operations – Lathe, Mill | X |  | Yes |  |
| Computer Numerical Control Programming | X |  | Yes |  |
| Manufacturing Technology |  | X | Yes |  |

Please discuss the following questions regarding all area Certificates of Achievement (CA):

1. List certificates that are proposed for *addition*.
2. List certificates that are proposed for *deletion*.
3. For this CA, what are the SOC codes (Occupational Titles and codes) that students who complete the CA will be able to obtain entry-level employment in, and what are the projected annual openings and median salary for each occupational title? You can use your latest Program Review data for your response.
4. For this CA, what process was followed to ensure the required and possible elective courses were adequate for entry level employment (such as advisory committee input, surveys, industry feedback, licensing or accreditation agencies)? How often do/will you re-examine the effectiveness of certificate requirements?
5. What is your annual completion target (number of certificates awarded) for this CA? What was the number of awards in this CA for each of the past three years? Based on your results, what changes could you make in your program to meet or continue to exceed your target (such as course content, scheduling/sequence, outreach, instructional strategies)?
6. Based on what you know about your area, what emerging/potential institutional factors (internal) and industry factors (external) will impact this certificate? How are you planning to incorporate these factors in your planning and evaluation of this certificate?
7. No certificates are proposed for addition.
8. No certificates are proposed for deletion.

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| --- | --- | --- |
| **SOC Code & Job Title** | **Projected Annual Openings** | **Median Salary** |
| 51-4011 Computer-Controlled Machine Tool Operators, Metal and Plastic | 3 | $19.43/hour ($40,421/year) |
| 51-4031 Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic | 2 | $11.29/hour ($23,480/year) |
| 51-4041 Machinists | 16 | $17.85/hour ($37,129/year) |

1. The required and elective courses for the certificate and degree programs were selected in consultation with the program advisory committee and well as through study of industrial certification standards. The certification standards, developed by an organization known as NIMS (National Institute for Metalworking Standards), establish a framework for training, however, require an annual program accreditation fee of $1,500. Only four community colleges in the state of California offer NIMS certification. Currently NIMS certification is most popular east of the Mississippi River.
2. In the past three years the following numbers of certificates have been awarded:

|  |  |
| --- | --- |
| **Certificate Name** | **JSC** |
| JSC Basic Machine Tool Operations – Lathe, Mill | 165 |
| JSC Computer Numerical Control Programming | 39 |
| CA Manufacturing Technology | 0 |

The Basic Machine Tool Operations JSC has requires a single course: MFGT B1AB “Machine Tool Processes”. This course serves many purposes:

Entry-level training - This single 3-unit course provides students with the technical and analytical skills necessary to obtain employment as an entry-level machinist. There are many opportunities for well-paid careers as machinists, as shown in #3 of this section. However, only approximately 3-5% students seek employment as machinists. Those who do can establish a long-term career. It is not uncommon for this course to be taken as professional development by currently-working machinists, often times because they never received formal training.

Other program support – MFGT B1AB is required for the Welding CA and AS degree and the Industrial Drawing AS degree. It is an elective for the Electronics AS degree. Engineering students occasionally take the course out of personal and professional interest. Although the course is not currently articulated with any engineering programs many mechanical engineering programs do require students to take a course on manufacturing processes.

General Interest – Many students in MFGT B1AB take the course out of personal interest – to support a hobby, a business interest, or simply out of curiosity to understand “how stuff is made”.

The Computer Numerical Control JSC requires MFGT B2 (CNC Lathe) and MFGT B3 (CNC Mill). The courses draw a similar cross-section of students, many of whom are continuing from the MFGT B1AB course. These courses also draw working machinists seeking to broaden their skills. However, many students do not complete the two courses required for the JSC because the course involves skills akin to computer programming and less of the mechanical aptitude required in MFGT B1AB.

Zero CA Manufacturing Technology have been awarded zero in the past five years. I would like to increase that number to at least 5 per year.

The faculty of this program plan to work closely with the office of Career and Technical Education to better utilize its resources to market the program to students seeking careers. The 2014-15 goals of the CTE office for the manufacturing technology program are to increase nontraditional participation and completion rates and the expansion of the program.