

# The Instructional (Academic Affairs) Program Review Narrative Report

1. College: *Laney College*

**Discipline, Department or Program:** Biomanufacturing Program\_

**Date:** Due by November 13, 2012

**Members of the Instructional Program Review Team:**

*Dr. Leslie MacKenzie Blackie, Doug Bruce, Rebecca Bailey*

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2. **Narrative Description of the Discipline, Department or Program:**

Please provide a general statement of primary goals and objectives of the discipline, department or program in light of the College's priorities and goals. Include any unique characteristics, degrees and certificates the program or department currently offers, concerns or trends affecting the discipline, department or program, and any significant changes or needs anticipated in the next three years.

The mission of the Biomanufacturing program within the Biology department is to prepare graduates to work in the biomanufacturing/pharmaceutical industry as technicians. Students will learn how to operate and maintain the equipment used to manufacture protein pharmaceutical products; culture bacterial, yeast and mammalian cells and recover the proteins that those cells produce. Students will follow good manufacturing practices by maintaining records in order to comply with quality assurance procedures and government regulations.

Laney College currently offers two certificate programs in Biomanufacturing: Certificate of Proficiency in Biomanufacturing skills (9 units) and the Certificate of Achievement in Biomanufacturing (17 units). We have written curriculum and gone through the process to have state approval for an Associates in Science degree (and Certificate of Achievement – additional 14 units) in Biomanufacturing Production. The AS degree builds on the foundation provided by the first two certificates and teaches more laboratory skills and more lecture based material. This additional education will allow the students to be eligible for higher level employment within the Biomanufacturing industry (technician jobs in addition to entry level jobs) These programs are stackable certificates that offer students the flexibility to get more education and improve their position in the workforce in a career ladder. There are many pharmaceutical companies in the Bay Area and the Associate of Science in Biomanufacturing Production program will help to fill a vital need in the pharmaceutical/biomanufacturing workforce.

We have been concerned that the cuts to courses and the inability to add in new courses to the schedule will damage the developing Biomanufacturing program. In

addition, cuts to the offerings of sections of classes in other departments (Chemistry and Math) necessary for completion of the certificates has also made it more difficult for students to achieve their educational goals.

The Biomanufacturing Program requires a full-time instructor, one half-time lab technician, a half-time program coordinator, increased supply and equipment budgets, a student aide budget, money for tutors and additional space to meet current needs and accommodate anticipated growth as well as the opportunity to implement the new courses for the most advanced Biomanufacturing degree . The Biomanufacturing program needs a dedicated lab space to be able to house the specialized equipment for the program and allow for more classes to be offered.

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### 3. Curriculum:

a. Is the curriculum current and effective? Have course outlines been updated within the last three years?

The curriculum is current and effective.

b. Please indicate how many active courses are in the department inventory. There are 10 Classes in the Biology department that are specific to the Biomanufacturing program

c. How many of those have been updated in the last 6 years?

All of the Biomanufacturing courses have been updated since 2011

d. If courses have not been updated within the last 6 years, what plans are in place to remedy this?

Not Applicable

e. Has your department conducted a curriculum review of course outlines? If not, what are the plans to remedy this?

The Biomanufacturing courses in the certificate programs, Bio 75 and 76, have been taught for several years have been through a curriculum review. The other courses were written recently as part of the development of the AS in Biomanufacturing Production degree. We have not yet scheduled the teaching of the second year classes for the AS degree.

f. What are the department's plans for curriculum improvement (i.e., courses to be developed, updated, enhanced, or deactivated)? Have prerequisites, co-requisites, and advisories been validated? Is the date of validation on the course outline?

We have verified prerequisites and updated textbooks, all of which is reflected in Curricunet.

- g. What steps has the department taken to incorporate student learning outcomes (SLOs) in the curriculum? Are outcomes set for each course? If not, which courses do not have outcomes?

Student Learning Outcomes are completely incorporated into the curriculum. All courses have SLOs developed. The Biomanufacturing courses for the one semester and one year certificates have completed an assessment cycle and are being assessed in their second cycle. The courses for the AS degree have not yet been taught, but the SLOs are in place for those classes.

- h. If applicable, describe the efforts to develop outcomes at the program level. In which ways do these outcomes align with the institutional outcomes? (Note: if your department has no certificate or degree offerings and does not offer a course as part of one of the College's associate degree programs, then skip questions 3.h. and 3.i.)

Program Level Outcomes are developed for the Biomanufacturing Program for the Certificate of Proficiency in Biomanufacturing Skills, the Certificate of Achievement in Biomanufacturing and the AS in Biomanufacturing Production.. These outcomes have specific student level outcomes that align to the PLO. SLO Assessments from the classes in the program are then used in the analysis of the specific PLO

- i. Provide one program level outcome (PLOs), and the assessment tool that will be used to measure the program level outcome this fall 2012 and spring 2013. The PLO that will be assessed this year is "Maintain a laboratory notebook according to standard scientific guidelines". The assessment tool will be an analysis of the student kept notebooks using a grading rubric that has been handed out to the students previously.

One cycle of PLOs has been completed for both the Certificate of Proficiency in Biomanufacturing Skills and the Certificate of Achievement in Biomanufacturing and the reports are in taskstream.

- j. How are the SLOs and PLOs, if applicable, mapped to the college's Institutional Learning Outcomes  
Program Level Outcomes are developed for the Biomanufacturing Program. These outcomes align with the institutional outcomes.

*Institutional Outcome: Communication - Students will effectively express and exchange ideas through various modes of communication*

The PLOs that support the institutional outcome relating to communication  
-Maintain a laboratory notebook according to standard scientific guidelines  
- Write clear, well-documented lab reports using the language of science

*Institutional Outcome Critical thinking and Problem Solving- Students will be able to think critically and solve problems by identifying relevant information, evaluating alternatives, synthesizing findings and implementing effective solutions*

The PLO that supports the institutional outcome relating to critical thinking  
-Apply mathematics problems to solve quantitative problems

*Institutional Outcomes Career Technical Education – Students will demonstrate technical skills in keeping with the demands of their field of study*

The PLOs that support the institutional outcome relating to CTE

- Describe and practice safety guidelines relating to working with laboratory equipment.
- Set up and manipulate laboratory equipment, carry out experimental procedures and identify possible sources of error.

*Institutional outcome Global Awareness, Ethics and Civic Responsibility – Students will be prepared to practice community engagement that addresses one or more of the following: environmental responsibility, social justice and cultural diversity.*

The PLO that supports the institutional outcome relating to Global awareness :

- Explain and discuss both verbally and in writing the science concepts listed in the course content, as well as their relevance to everyday events and circumstances in a broad interdisciplinary context

k. Recommendations and priorities.

We plan to continue to make assessment of SLOs and PLOs a priority.

We need to offer the second year of classes that will allow students to complete the AS degree in Biomanufacturing Production. Once those classes are offered we will be able to assess SLOs for the classes and PLOs for the program.

*See Attachment C for listing of the courses in your discipline/department. If applicable, this document also lists the certificate and degree programs offered. Be sure to check the appropriate boxes and submit completed forms as part of this Program Review.*

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#### **4. Instruction:**

- a. Describe effective and innovative strategies used by faculty to involve students in the learning process. How has new technology been used by the department to improve student learning?

The Biomanufacturing curriculum is primarily lab driven. Biomanufacturing instructors use hands- on activities in labs to teach following of protocols and the mastering of skills to manipulate equipment and new technology in the laboratory. In the introductory lab classes students are introduced to a new piece of equipment every lab period. The use of equipment is reinforced in subsequent lab periods for the introductory classes and in the more advanced biomanufacturing classes. The classes facilitate group discussion and team work as well as data analysis.

- b. How does the department maintain the integrity and consistency of academic standards within the discipline?

The Biomanufacturing faculty discuss issues such as exams, assignments and grading scales to ensure integrity and consistency of standards. In addition, the faculty attend conferences and seminars dedicated to biomanufacturing/ biotechnology programs

during the summer. Consultation with Industry Advisory Boards also contributes to the ongoing relevance of the curriculum.

- c. Discuss the enrollment trends of your department. What is the student demand for specific courses? How do you know? Identify factors that are affecting enrollments.

Enrollment has held fairly steady over the past three years, although we have increased demand when there is support from the Career Advancement Academy to help with recruitment and tutoring support as well as assistance with navigating the enrollment process.

Productivity in the biomanufacturing classes is comparable to the productivity in other CTE programs across the campus. CTE classes in general have lower enrollment (limited by the access to lab stations/ hands on experiences with equipment) than lecture only classes, which lowers the productivity equation.

- d. Are courses scheduled in a manner that meets student needs and demand? Please describe the criteria and considerations used in the scheduling process.

We communicate with the counseling department and attempt to meet student demand in terms of numbers of sections offered of the Biomanufacturing program and at what time of day. We listen to the students who discuss the challenges in scheduling and respond to the best of our ability, although scheduling lab classes is difficult due to the lack of lab space available. We research other department's schedules and communicate with the Chemistry and Math departments since we share students in the certificate programs.

Students are interested in continuing their education beyond the certificate level to achieve the AS in Biomanufacturing. This curriculum has been written, and gone through the state approval process for a degree program, but the classes have yet to be offered. We need to offer more sections of the classes in the first year and begin to offer the classes for the second year so that students can complete the AS degree in addition to the two certificate programs.

- e. Recommendations and priorities.

We need to be able to add in sections to meet student demand for more opportunity to start in the Biomanufacturing Program. We also need to schedule the second year of classes for the AS degree so that students can earn the AS and then have more success in placement in the workforce or go onto further education in a 4 year school.

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## **5. Student Success:**

- a. Describe student retention and program completion (degrees, certificates, persistence rates) trends in the department. What initiatives can the department take to improve retention and completion rates.

Student retention in the biomanufacturing classes is a little lower than the overall biology department average of 76%. (Biol 75 has 73% retention, Biol76 has 66% retention and Math 208 has 66% ) Persistence rates in the biology department is about 63%. Program completion had a large drop the year that the Math class (a requirement of both of the certificate programs) was offered only one of the semesters. There is an increase in retention and productivity when the Career Advancement Academy had funding to recruit and tutorial support for the biomanufacturing students. We believe it is critical to maintain course offerings every semester for the biomanufacturing programs so that students can start working on certificates either Fall or Spring semester. It is also critical to student success to have student assistants in the biomanufacturing lab classes and to assist with the specialized tutoring that is necessary for biomanufacturing classes.

Additional funding so that instructors in the Math, Chemistry and Biology (biomanufacturing) program can work to further develop the learning community that is the one semester Biomanufacturing certificate program will also help student retention, success and persistence into the longer certificate programs.

b. Identify common challenges to learning among your students? What services are needed for these students to improve their learning? Describe the department's efforts to access these services. What are your department's instructional support needs?

Challenges to learning – The biomanufacturing program has many reentry students and students who are job training. These students find the math and science curriculum challenging to learn. Biomanufacturing students need tutors. Typically the tutoring center does not have tutors that fill the needs of understanding the integration of the course material in the certificate and the advanced knowledge needed to successfully tutor in the math and science classes in the program.

In the past, the Biomanufacturing program was a part of the East Bay Career Advancement Academy, a skill development program that assists students with registration, financial aid, counseling, tutoring, books and other services. We have seen the retention and success rate increase in semesters when the support was available to the students.

Student assistants in the classroom are a critical need. The student workers help with setup and cleanup of labs, freeing the instructor to spend more time in student contact and facilitating a healthy and safe learning environment. Student workers are also very helpful answering questions and helping students to use equipment. We feel student workers are critical to retention.

The Biomanufacturing program requires a supply/small equipment budget of \$2,000 per year to run the classes in the two certificate programs. This budget will need to increase to \$5,000 per year to run the additional lab classes for the AS degree. In addition to purchasing lab materials that are consumed during the teaching of labs, specific tools (for example micropipetors and glassware) need repair or replacement

due to heavy student use. The Biomanufacturing program supply budget currently is included in the Biology department budget.

c. Describe the department's effort to assess student learning at the course level. Student Learning Outcomes are completely incorporated into the curriculum. All courses have SLOs developed. The Biomanufacturing courses for the one semester and one year certificates have completed an assessment cycle and are being assessed in their second cycle. This data has all been entered into taskstream.

The courses for the AS degree have not yet been taught, but the SLOs are in place for those classes and assessment can begin once the courses are being taught.

In nearly all cases of assessment we have met success criteria and in all cases we consistently use assessment results to generate conversations among instructors and find ways to improve learning.

Describe the efforts to assess student learning at the program level. In which ways has the department used student learning assessment results for improvement?

Program Level Outcomes are developed for the Biomanufacturing Program for the Certificate of Proficiency in Biomanufacturing Skills, the Certificate of Achievement in Biomanufacturing and the AS in Biomanufacturing Production.. These outcomes have specific student level outcomes that align to the PLO. SLO Assessments from the classes in the program are then used in the analysis of the specific PLO.

A complete assessment cycle has been done for both the Certificate of Proficiency in Biomanufacturing Skills and the Certificate of Achievement in Biomanufacturing and these reports have been entered into taskstream. In nearly all cases of assessment we have met success criteria and in all cases we consistently use assessment results to generate conversations among instructors and find ways to improve learning.

d. Recommendations and priorities.

Student assistants/workers in the classroom and tutors for support outside classroom instructional time are critical to student success. Continue to request adequate funding to serve students and increase funding for areas such as student workers and supplies/equipment. Coordinate efforts of multiple departments involved in program level assessment

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## **6. Human and Physical Resources (including equipment and facilities)**

a. Describe your current level of staff, including full-time and part-time faculty, classified staff, and other categories of employment

We currently have no fulltime exclusively assigned for the biomanufacturing program, although the coordinator of the program is a fulltime faculty member who works on the biomanufacturing program as an overload. Courses are taught

by 1-2 part-time instructors. We have no lab technician for the biomanufacturing program, instructors have to do their own lab prep, with the assistance of student workers.

- b. Describe your current use of facilities and equipment.

We use A237 as the Biomanufacturing Lab and teach the lecture class in B201. B200 is shared office space for the instructors. We have a great deal of equipment that is used in preparation and performance of laboratories. The autoclave (sterilizer) and other equipment used in preparation of labs are in A237. The laboratory rooms A237, B201 store specific equipment for the biomanufacturing classes. In addition room 104 stores disposable items for the biomanufacturing program – it is critical to have a storage area for the quantity of tubes, pipettes, tips, and plates that are used for each section of the biomanufacturing lab classes.

Currently the Biomanufacturing teaching lab is A237 which is shared space with the chemistry department. The chemistry department has increased demands for new sections as well, and thus it is difficult to find time that we can expand the offerings of the Biomanufacturing program within the time constraints of the available room use. We need a dedicated Biomanufacturing lab space in addition to the labs already defined as chemistry or biology lab spaces. Our growing Biomanufacturing program requires more space not only for teaching but also to maintain proper function of the equipment.

- c. Are the human and physical resources, including equipment and location, adequate for all the courses offered by your department (or program)? What are your key staffing and facilities needs for the next three years? Why?

We need a full-time instructor for the Biomanufacturing program to give it stability and create more opportunities for increased offerings of the course work – not only additional sections of introductory Biomanufacturing courses required for the one semester certificate, but also the additional courses in the second year leading to an AS in Biomanufacturing. We need a half-time program coordinator to create more opportunities for pursuing grants and interacting with community partners. We need a half-time technician dedicated to the preparation of the biomanufacturing program, currently the prep is handled by the faculty and student workers for the Biomanufacturing classes. We need 20 hours of student assistants/month for the Fall and Spring semesters, and if we start offering summer classes we would need that time in the summer as well. We also need tutors to help students be successful in our courses.

- d. If your department experienced a reduction in resources, describe the impact of that reduction on the overall educational quality of your unit and the College. The Biomanufacturing program uses Perkins funds for supplies (because the biology department budget has been cut), faculty do the ordering of supplies and prep for the labs (because there is no lab tech to prepare labs), and offer informal seminars on resume writing, job placement agencies and try to keep lists of



employment rates (because there is no program coordinator). All of this is done in addition to teaching the classes for the certificates.

We also overfill our classes which reduces the time instructors can spend with students even though smaller class sizes with more sections offered would be a better educational experience. If classes are not offered or are cut because not every seat is filled due to the high enrollments expected, then the program will lose momentum in students enrolling to complete certificates or degree programs.

If this program suffers more reduction in resources then Laney College runs the risk of losing the Biomanufacturing program.

- e. How does the department plan to sustain the quality of instruction and/or services offered through your department in the current environment of reduced resources?

The Biomanufacturing program has actively been involved in looking for grant support to buy supplies, equipment, pay for curriculum development and offer classes. The program is currently supported by Perkins funds. We have had local grants in the past and are currently part of a department of Labor grant that will help to maintain the current program of two certificates and expand to offer the AS degree in Biomanufacturing.

- f. What does the department recommend that the college do to maintain quality educational programs and services?

The Biomanufacturing program requires adequate supply and equipment budgets to allow the labs to be run effectively. Instructors currently spend their own money to buy overhead projector bulbs, consumable items from the grocery store for experiments, hand soap, label tape, and gloves. If we did not spend our own money, we could not effectively run the labs for our students.

Adjust the class sizes to more realistic levels – not requiring class maximums of 35 for a lab with 27 stations, or requiring a class size of 20 when there are only 24 lab stations. If we do not overfill the classes, then they run the risk of being cancelled due to low enrollment, and allow more sections of a given class for a better educational experience for the students. Also allow new classes to have a smaller enrollment in their first few times of being offered – it takes time to build word of mouth for students to get excited about new classes.

Do not cancel so many classes that it is difficult for students to take all their required classes at Laney –too many students are driving between two and three community colleges to try to complete their transfer or certificate requirements. This also impacts student persistence in the various programs.

Seek to obtain Laney’s “fair share” of District resources, distribute money fairly within the College, pursue grants and donations, provide faculty with help and information about pursuing funding sources.

- g. Please provide any other recommendations and priorities. (Use the appropriate request forms within Attachment D.)

Hire a fulltime instructor, a half-time technician, a half-time program coordinator. Identify a space that can become a dedicated biomanufacturing lab classroom with a small amount of remodeling to support biomanufacturing equipment use. In the meantime, adequate budget for supplies and equipment as well as support for smaller class sizes and new offerings in the schedule to allow the Biomanufacturing program to maintain and grow.

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## 7. Community Outreach and Articulation

### *For Career and Technical Education Programs:*

- a. Describe the department's connection with industry. Is there an Advisory Board or Advisory Committee for the program? If so, how often does it meet? Is the program adequately preparing students for careers in the field? How are you assessing this?

Laney Biomanufacturing Program has an Industry Advisory Board that meets formally once a year and has informal consultations throughout the year. The Advisory board has members from several pharmaceutical companies as well as educators from Biomanufacturing programs at other colleges.

#### **Recommendations from the Industry Advisory Committee include:**

Experience is increasingly important for attaining jobs, even entry level jobs. Having education in specific techniques and equipment taught in the Laney Biomanufacturing program, and working with the temporary staffing agencies increases the student's likelihood of being hired into the workforce.

Basic Skills training, particularly the Math 208, Laboratory skills for scientists is important, since many applicants have weak or rusty math skills. Other skills that are important are aseptic techniques, working with chemicals, being detail oriented, work well in teams and good documentation.

- b. Have students completing the program attained a foundation of technical and career skills? How do you know? What are the completion rates in your program?

The Biomanufacturing Certificate Program at Laney College is a career ladder program, intended to train students in basic biotechnology and biomanufacturing skills. The Certificate of Proficiency in Biomanufacturing Skills can be completed in one semester. Students can then continue their academic training by taking additional courses to earn a Certificate of Achievement in Biomanufacturing. Students can then continue on to earn

an Associates of Science in Biomanufacturing Production that will prepare them for a higher level of employment within the manufacturing sector of the biotech industry. The programs consist of biotechnology –oriented biology, chemistry and math courses with a heavy emphasis on laboratory experience.

In 2009-10 there were 23 certificates completed and in 2010-2011 there were 8. (This is also the year that Math 208, an essential component of both certificate programs was only offered one semester). These numbers include both the one semester and the two semester program. During the academic year of 2010-2011, the two semester program went through the state approval process to become the Certificate of Achievement in Biomanufacturing. In 2011-2012 there were 5 certificates of achievement granted and 16 certificates of proficiency.

- c. What are the employment placement rates? Include a description of job titles and salaries. What is the relationship between completion rates and employment rates?

Because of the current tightness of public and private capital it is difficult to predict growth in the biotechnology/biomanufacturing industry, although anecdotal evidence indicates that companies are beginning to hire again. Particularly, because of the many products in the pipeline, companies remain optimistic that they will be continuing to expand and hire, particularly as manufacturing associates, research associates and in regulatory and clinical affairs as well as glassware technician, media prep technician and in validation.

The Laney Career Technical Education Advisory Committee is participating in a survey to collect data on the employment placement rates of our students. A considerable number of students who have not yet been placed in jobs have chosen to continue on in their education; some are now completing the Certificate of Achievement in Biomanufacturing. Others are working toward AS or BS degrees. We work with Kelly Scientific, a biotechnology oriented-staffing agency in our area to help place candidates in positions in the Biotechnology and Biomanufacturing fields. We hope to establish similar relationships with Aerotek and Manpower, two other biotechnology oriented staffing agencies in the area.

What are the employment projections (numbers of replacement and new positions) for these job titles over the next 10 years using the California Employment Development Department Labor Market Information?  
(<http://www.labormarketinfo.edd.ca.gov/Content.asp?pageid=1004> , and <http://www.laney.edu/wp/educational-master-plan/2010-educational-master-plan/> for the Laney College Educational Master Plan, Chapter II, pps. 18-30.)

### **Labor Market Information and Analysis**

The following are some statistics about the biotechnology industry in Northern California obtained from baybio.org from the 2010 BayBio2010 impact report. “From 2003 to 2008 California employment in the life science industry climbed by a steady 3.29%. Despite the recent economic downturn,

California life science industry continues to expand its portfolio of therapeutics. The growth of phase II, phase III and marketed treatments portrays the ability of California companies to adapt and grow despite a decrease in the total investments”.

- 271,000 people are employed by life science companies
- 1/3 of entire US Life sciences industry is based in Northern California
- There are more than 900 treatments in California research pipeline
- 233 treatments in Phase III
- 68 preapproved treatments, 148 approved treatments and 1754 treatments on the market
- more than 3 billion in NIH Grants Awarded to Northern California Organizations
- 1465 millions of venture capital in biotechnology in Northern California, which accounts for 15% of the total venture capital investment in the US.

Although the recession has impacted hiring, the industry remains robust, and new entry level applicants will continue to be needed as more of the products in the pipeline are approved and are manufactured.

According to the Employment Development Department, Biotechnology jobs in California [www.labormarketinfo.edd.ca.gov](http://www.labormarketinfo.edd.ca.gov) . demand for biotechnology jobs requiring only a high school degree will slightly decrease (laboratory support workers, quality control inspectors from year 2000 to year 2010), but demand for Documentation coordinators will increase 19% from 2000 to 2010. Biotechnology jobs requiring associates degrees or certificates will increase including an estimated need of 213,600 manufacturing technicians (up 8% from 2000), and growth in assay analysts (16,100 workers, up 35%) laboratory technicians (26,900 workers, up 28% and instrumentation technicians (107,600 workers up 3%). These numbers are for the state of California.

According to the Employment Development Department statistics for the Oakland-Fremont-Hayward Metropolitan Divisions in Occupational Projections of Employment there will be annual openings of

Life, Physical and Social science Technicians #194000

**145 annual openings and average wage of \$15.09-29.32/hour**

Medical/Clinical lab Technicians #292012

**30 annual openings average wage of \$15.68-26.46/hour**

(Listed as occupations comparable to Laboratory Assistants by the Bureau of Labor Statistics on the EDD website)

Industrial engineering Technicians#173026

**9 annual openings average wage range/hour \$20.15 to 35.71**

(Listed as occupations comparable to Quality Control Analysts by the Bureau of Labor Statistics on the EDD website)

Management Analysts #13-1111

**140 annual openings Average wage range \$ 27.02-47.35**

(Listed as occupations comparable to Documentation Specialists by the Bureau of Labor Statistics on the EDD website)

- d. What industry trends are most critical for the future viability of the program? What are the implications of these trends for curriculum development and improvement? Community Colleges are very important to build the workforce pipeline and upgrade skills. Companies are more and more willing to seek candidates with associate degrees so expanding the established certificate programs to include associate degree is the next stage of growth for the Laney College program

According to studies by the Centers of Excellence (SF Bay Area and Greater Silicon Valley) [www.coecc.net](http://www.coecc.net)

Medical/Clinical Laboratory Technicians are in the top 10 fastest growing Biotechnology occupations in California and the educational degree required is an Associate Degree. The occupation of Team assemblers is also in the top 10 fastest growing occupations and the educational goal listed is “moderate on the job training. The biomanufacturing program’s advisory committee members confirm that the Career ladder program of certificates and associates degree taught at Laney College develops the skill sets and course requirements responsive to the industry needs.

***For transfer programs:***

- e. Describe the department’s efforts in meeting with and collaborating with local 4-year institutions. How is the program preparing students for upper division course work?

The Biomanufacturing Program has specialized biomanufacturing classes and “core” science classes that already articulate with local 4 year institutions. Students taking “core” science classes in the chemistry and biology departments often transfer to 4 year institutions.

As part of the DOL grant recently awarded to a consortium of colleges and programs including the Biomanufacturing Program at Laney there will be discussions between the consortium of colleges and the local 4 year colleges (both CSU and UCB) to deepen articulation between the systems. This will include identification of a TMC or a modification of appropriate STEM pathways

- f. Has there been a Transfer Model Curriculum identified for your program? Has it been implemented? If not, what are the plans to do so?

There is no TMC identified for the Biomanufacturing Program

***For all instructional programs:***

- g. Describe the department's efforts to ensure that the curriculum responds to the needs of the constituencies that it serves.

In addition to the two certificate programs we have developed the AS degree in Biomanufacturing Production as the industry prefers to hire students with AS degrees. This will allow our students to upgrade education to be further promoted in the workforce. We have spent a great deal of time assessing course and program level SLOs. We listen to student input and the counseling department, as well as other departments who share our students and try to respond to student need, both in scheduling classes and increasing available offerings.

- h. Please indicate how many of the full and part time faculty have been evaluated in the last three years. For faculty that have not been evaluated in the last three years, what are your plans to become current.

Faculty who work in the Biomanufacturing Program also teach classes within the biology department "core" classes and thus are evaluated according the schedule in the Biology department. We evaluated one of the part-time faculty in Fall 2011, and are scheduled to evaluate another part-time faculty member in Spring 2013.

- i. Recommendations and priorities.

Continue the assessment process at the SLO and PLO level as well as faculty evaluations and continue to work with the Industry Advisory Board to maintain the appropriateness of the Biomanufacturing curriculum. Ideally we would have a staff position that would be responsible for recruitment into the program and help with job placement and tracking employment rates.