

Program Review: Biotechnology

Program Description and Scope:

- *Program Review Title:* Biotechnology
- *Academic year:* 2016/2017
- *Review Type:* Instructional Disciplines
- *Program/Departments:* Biotechnology Program (04004)
- *Authority Code:* 44-Dean, Science, Engineering, and Mathematics
- *External Regulations:* No
- *Provide a brief narrative that describes the instructional program/discipline:*
The Biotechnology Certificate and Degree Programs at Ohlone College are designed to prepare students with practical laboratory skills and the theoretical knowledge needed for entry-level jobs in the local biotechnology industry.

College Mission:

- *Mission Statement:*
Ohlone College responds to the educational needs of our diverse community and economy by offering high quality instruction supporting basic skills, career development, university transfer, and personal enrichment and by awarding associate degrees and certificates to eligible students in an innovative, multicultural environment where successful learning and achievement are highly valued, supported, and continually assessed.
- *Program Relation to College Mission:*
 - Career Entry (CTE)
 - University Transfer
 - Economic Development
- *State Your Program Mission/Purpose:*
The purpose of our program is to provide the education and hands-on training needed for our graduates to be well qualified for entry-level jobs in the biotechnology industry, and to serve the community through outreach programs.
- *Briefly Describe Program Accomplishments:*
We have designed and implemented a series of certificates and an AS Degree in Biotechnology that prepare our students for jobs at local biotech companies. With support from the College and by securing grant funding, we have been able to obtain the modern instrumentation needed for our graduates to come out of our program with relevant, current skills. Our advisory board is key in shaping our curriculum, and we respond to industry trends as they arise by modifying or adding to existing classes or certificates. We have an internship program in which our students get experience working at local companies. We have a successful outreach program with local high schools, with articulated classes that high school students can take for 2+2 credit. We are active in the

community, participating in events such as the Bay Area Science Festival, and Science Night events at Ohlone and other local schools. We have partnered with the ACWIB and Growth Sector to take a cohort of un/under-employed workers through our BioManufacturing program. We have implemented changes to our program such as adding embedded tutors to some of our classes that have helped to improve student success.

Achievement and Resource Data Analysis:

Research Questions:

1. This program noticeably attracts higher numbers of older students, and there has been a significant decline in students under the age of 25. What can be done as a part of the PIO process to create a plan to attract younger students?

Resource Assessment Summary:

1. *Academic Year:* 2014-15
2. *Activity Center Fund 10 Budget Allocation:* \$527230.00
3. *FTEs:* Fall: 23 Spring: 23 Summer: 0
4. *WSCH/FTEF:* Fall: 262 Spring: 300 Summer: 0
5. *Course Sections Offered:* Fall: 23 Spring: 19 Summer: 0
6. *Sections Taught FT Faculty:* Fall: 10 Spring: 5 Summer: 0
7. *Sections Taught PT Faculty:* Fall: 19 Spring: 19 Summer: 0

Human Resources:

1. *# of FT Faculty:* 1
2. *# of PT Faculty:* 5
3. *# of Classified Staff:* 0
4. *# of Administrators:* 0
5. *% Faculty release/reassigned time:* 0.20%
6. *Technology:*
 - Specialized Software
 - Technology Enhanced Instructional Equipment
 - Laptops
7. *Physical Resources:*
 - General Classrooms
 - Specialized Labs
 - Tutoring/Learning Center

Program Analysis PSLOs - Student Learning:

(Key: I-Introduced, P-Practiced with Feedback, M-Demonstrated at the Mastery Level)

1. *PSLO Matrix:*

Course	PSLO-1	PSLO-2	PSLO-3	PSLO-4	PSLO-5
BIOT 100					I
BIOT 101	P	P	P	P	P
BIOT 103	P	P	P	P	P
BIOT 104A	P	P		P	
BIOT 105	P	P	P	P	P
BIOT 110A	P	P	P	P	P
BIOT 111A	M	M	M	M	M
BIOT 111B	M	M	M	M	M
BIOT 112		P			P
BIOT 113				I	
BIOT 114	P	P	P	P	P
BIOT 115A	P	P	P	P	P
BIOT 115B	P	P	P	P	P
BIOT 117	P	P	P	P	P
BIOT 119		P		P	
BIOT 120A		I		I	I
BIOT 120B		P		P	P
BIOT 121		I			
BIOT 203					
CS 131	P				
CS 133	P				

2. *Please Indicate the PSLO(s) which you are reporting on:*
 - Employ the correct mathematical rules of operation, and be able to apply these to the preparation of reagents, buffers, pH adjustments, etc.
 - Demonstrate the use of instrumentation and techniques common to the biotechnology laboratory.
 - Demonstrate the ability to keep a legal scientific notebook compatible with Biotechnology Industry standards.
 - Practice proper laboratory safety.
 - Demonstrate an understanding of key theoretical concepts in molecular biology and biotechnology as they relate to the biotechnology industry.
3. *Analyze and summarize your assessment findings â?? What in the data jumped out?*

There is general agreement among faculty teaching the biotech classes that students tend to do well with SLOs 2, 3, and 4, but need more support with SLOs 1 and 5. Calculation skills are lacking in many students that enter the program, and this is a big reason for loss from the program in Biot105. Understanding of theory is usually good in students who come into our program with a prior degree in the

sciences (which is a substantial fraction of our students), but for those students without a science background, it is sometimes hard to keep up with the rapid pace of the classes. In all students we see a need for increased focus on critical thinking; this is reflected in the evaluations our interns receive from their industry mentors.

4. *Give examples of assessments used for your PSLO analysis:*
Intern evaluations from industry mentors; rubrics on keeping proper lab notebooks; exam and quiz questions to test calculation skills and understanding of theory (applied to solution making, dilutions, etc.); research poster presentations to demonstrate application of theory to research in biotech.
5. *Describe input from Program Advisory Committee (if applicable):*
Advisory board has recommended that students get a better understanding of the business of biotech (in addition to the science). A new Operations class has now been approved by the Chancellor's office, and an Operations certificate that includes that class is up for approval by our Advisory Board Dec 2017.
6. *Comments:*

Program Improvement Objectives

1. *Based on the program data analysis and PSLO analysis, identify your Program Improvement Objective(s): What are you going to do? Why are you going to do it?*
Development of LAB Program partnerships, LAB Learning Community, LAB Summer Bridge, with an emphasis on bringing high school students into our biotech pathway. This will help address the decline in younger students enrolling in biotech classes, and offer a career pathway to local high school graduates.

Notes (optional): Please include any notes related to your PIO. (2500 Character limit)

Our LAB program partnerships have expanded to include many different schools, with more than 100 students applying for 2+2 credit for articulated classes, but this has not translated into an increase in students from the high school programs enrolling at Ohlone in biotech certificate classes. This is partly due to the fact that our original local partners (Newark Memorial, Kennedy, and Logan) no longer offer biotech classes, so we don't get as many local enrollees. We need to focus on our partnership with American HS, work on articulation with MVRP classes, and help the teacher interested in developing a biotech program at Mt. Eden HS in Hayward. Students in these programs would be likeliest to attend Ohlone and possibly pursue certification in biotech. (See attached list of LAB program partner schools.)

Program PIO will address the following:

- Career Technical Education (CTE) Related
- Awareness of, and sensitivity to, diverse cultures and perspectives.
- Student Learning & Achievement
- Persistence

- Success Rates
- Increase Program Enrollments
- Equity/Disproportionate Representation
- Access to high quality courses - community needs
- Use human, fiscal, technological, and physical resources responsibly,

How will you assess the effectiveness of your PIO:

We'll look at the number of articulation agreements we have with high schools, number of teachers attending LAB workshops and training, number of tutors placed in HS classes, assessment of student understanding of college readiness among Summer Bridge participants, and enrollment of LAB HS students in Ohlone biotech classes.

PIO Action Plan:

How will you accomplish this?

Support the schools currently engaged in the LAB program, do more outreach to connect with students at these schools, engage teachers through high quality training workshops, improve communication about tutoring availability. We continue to provide a Spring Quiz Bowl event for the LAB schools, and a Summer Bridge class for LAB students.

What is your timeline?

Efforts are ongoing throughout the school year, with the first LAB teacher meeting just completed in November. A teacher workshop to train the HS teachers in Bioinformatics is scheduled for May, the Quiz Bowl event is scheduled for February, and the Summer Bridge is in June.

Who is going to do this?

Laurie Issel-Tarver coordinates these efforts.

PIO Status:

- In-Progress
- Revised

Closing the loop - Describe the results of your PIO implementation or completion:

This is an ongoing process, with more schools being added to our LAB Program and more high school courses being articulated. American High's articulation agreements had lapsed, but they are meeting with me (LIT) in December to work on renewals.

Conclusion: Complete if PIO has been completed

Fiscal Resources Status:

PIO Resources:

- Resource: People Time
Description: Outreach activities

2. *Based on the program data analysis and PSLO analysis, identify your Program Improvement Objective(s): What are you going to do? Why are you going to do it?*
Creation of new biotech certificate, with an "operations" focus.

Notes (optional): Please include any notes related to your PIO. (2500 Character limit)

Program PIO will address the following:

- Career Technical Education (CTE) Related
- Student Learning & Achievement
- Increase Program Enrollments
- Increase Degrees/Certifications
- Service Impacts
- Access to high quality courses - community needs
- Use human, fiscal, technological, and physical resources responsibly,

How will you assess the effectiveness of your PIO:

We will continue to engage with members of our industry advisory board to work on what curriculum might look like for these certificates, and whether they would hire students with these certifications.

PIO Action Plan:

How will you accomplish this?

Coming together of faculty with industry representatives for conversations about new classes needed and a proposed course list for new certificate. Followed by curriculum development and approval.

What is your timeline?

advisory board input 12/2015 Curriculum development 2016 Advisory board approval sought 12/2016

Who is going to do this?

Biotech faculty, especially Issel-Tarver and Mead.

PIO Status:

- In-Progress
- Revised

Closing the loop - Describe the results of your PIO implementation or completion:

Biotech Operations class was approved and will be offered in the Spring 2017, and on Dec6, 2016 we have our Advisory Board meeting to get final approval for the Operations Certificate.

Conclusion: Complete if PIO has been completed

Fiscal Resources Status:

PIO Resources:

- Resource: People Time
Description: Curriculum development
- Resource: Other Budget Related Resources Needed
Description: Stipend for Adjunct
Est. Cost: \$1,500.00

3. *Based on the program data analysis and PSLO analysis, identify your Program Improvement Objective(s): What are you going to do? Why are you going to do it?*
Increase recruitment efforts into biotech program, due to decline in enrollment. See LAB program PIO for efforts connected with younger students (HS grads).

Notes (optional): Please include any notes related to your PIO. (2500 Character limit)

Program PIO will address the following:

- Career Technical Education (CTE) Related
- Student Learning & Achievement
- Increase Program Enrollments
- Increase Degrees/Certifications
- Access to high quality courses - community needs

How will you assess the effectiveness of your PIO:

Measure enrollment numbers

PIO Action Plan:

How will you accomplish this?

Reaching out to current Ohlone students (especially Chem109 students, pre-nursing students waiting for admittance to nursing programs, biology students preparing to transfer, general biology students); raising community awareness of program. Speak with Ohlone counselors about program.

What is your timeline?

Ongoing

Who is going to do this?

Biotech faculty, with help from counselors, One-Stop personnel, others?

PIO Status:

- In-Progress

Closing the loop - Describe the results of your PIO implementation or completion:
LIT has created flyers (see attached) to let Chem109 students know that they are already 1/4 of the way to earning a biotech certificate. This effort last semester has drawn 1 new student this semester into Biot105.

Conclusion: Complete if PIO has been completed

Fiscal Resources Status:

PIO Resources:

- Resource: Other Budget Related Resources Needed
Description: Marketing Materials
Est. Cost: \$500.00

4. *Based on the program data analysis and PSLO analysis, identify your Program Improvement Objective(s): What are you going to do? Why are you going to do it?*
Finish editing and rolling out of Online Math Modules, to support biotech student success.

Notes (optional): Please include any notes related to your PIO. (2500 Character limit)

Math modules were created by Andy Bloom with DBS grant money, and put online by Elisa Webb. They still require some editing which will be done by Laurie Issel-Tarver over the winter break 2016/17, and the changes will be uploaded by Elisa Webb immediately thereafter.

Program PIO will address the following:

- Career Technical Education (CTE) Related
- Student Learning & Achievement
- Course Retention
- Course Completion
- Success Rates
- Increase Degrees/Certifications
- Equity/Disproportionate Representation

How will you assess the effectiveness of your PIO:

Student retention and success in Biot105 once modules are implemented (along with supportive tutoring); many students in this gateway class struggle with math and calculations. Also feedback from HS teachers who use these modules with their students.

PIO Action Plan:

How will you accomplish this?

Edits to be done and uploaded Dec2016/Jan2017

What is your timeline?

Winter 2016/17

Who is going to do this?

Laurie Issel-Tarver, Elisa Webb.

PIO Status:

- In-Progress
- Revised

Closing the loop - Describe the results of your PIO implementation or completion:

Good progress has been made in getting these modules online, but they need work before they are ready to launch.

Conclusion: Complete if PIO has been completed

Fiscal Resources Status:

- Josie Sette's Biotech Center grant has provided stipends for LIT and EW to complete this project.

PIO Resources:

- Resource: People Time
Description: Completion of online math modules

5. *Based on the program data analysis and PSLO analysis, identify your Program Improvement Objective(s): What are you going to do? Why are you going to do it?*
Curriculum revisions: 1) Create an internship class (not Special Projects) that has an open entry/exit format, to facilitate and simplify enrollment of students in internships. 2) Expand the hours of the HPLC class BIOT104A, in response to Advisory board suggestions and student and instructor feedback, to allow more hands-on experience with the instruments.

Notes (optional): Please include any notes related to your PIO. (2500 Character limit)

Program PIO will address the following:

- Career Technical Education (CTE) Related
- Student Learning & Achievement

How will you assess the effectiveness of your PIO:

We will look at the following: 1)streamlining of enrollments into the internships (fewer late-add and incomplete grade contracts required) 2)student achievement of SLOs in HPLC class, particularly on students' ability to work independently on the instruments.

PIO Action Plan:

How will you accomplish this?

Laurie Issel-Tarver will complete the curriculum revisions.

What is your timeline?

Spring 2017

Who is going to do this?

Laurie Issel-Tarver

PIO Status:

- New

Closing the loop - Describe the results of your PIO implementation or completion:

n/a

Conclusion: Complete if PIO has been completed

Fiscal Resources Status:

PIO Resources:

- Resource: People Time
Description: Curriculum modification and development

6. *Based on the program data analysis and PSLO analysis, identify your Program Improvement Objective(s): What are you going to do? Why are you going to do it?*
Explore lab modifications to the current BioTech Lab 2424 at the NCHST to increase class size and learning environment efficiencies.

Notes (optional): Please include any notes related to your PIO. (2500 Character limit)

The primary issue is with the overhead electrical and data system

Program PIO will address the following:

- Student Learning & Achievement
- Career Technical Education (CTE) Related
- Increase Program Enrollments

How will you assess the effectiveness of your PIO:

Through increase enrollments and faculty satisfaction with teaching in the learning space.

PIO Action Plan:

How will you accomplish this?

Will need facility assistance to explore feasibility of modifications.

What is your timeline?

2017-2019

Who is going to do this?

VP Academic Affairs, Dean of SEM, and Faculty

PIO Status:

- New

Closing the loop - Describe the results of your PIO implementation or completion:

Conclusion: Complete if PIO has been completed

Fiscal Resources Status:

PIO Resources:

- Resource: Other Budget Related Resources Needed
Description: Need estimate to modify current lab electrical overhead structure to reconfigure in floor
Est. Cost: \$100,000.00

Attached Files:

- [OhloneLABProgramParticipantsFall2016.docx](#)
- [Chem109 recruitment flyer fall 16.docx](#)
- [2013spring-sloa-biot101.pdf](#)
- [2014spring-sloa-biot105.pdf](#)
- [2013fall-sloa-biot121.pdf](#)
- [2014spring-sloa-biot115a.pdf](#)
- [2014spring-sloa-biot117.pdf](#)
- [InternEvaluations2014-15.pdf](#)