

Course Student Learning Outcomes Assessment

BIOL 192 Biotechnology B: Proteins

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General Information (Course Student Learning Outcomes Assessment)

Standing Requirements

Course Description

Fundamental skills in applied biotechnology necessary for any biotechnology laboratory but particularly focused on downstream manufacturing processes in biomanufacturing. Skills include maintenance of an industry standard notebook, preparation and sterilization of solutions, reagents and media; utilization of good aseptic technique, proper use and maintenance of laboratory equipment, adherence to quality control protocols, lab safety regulations, in vitro translation, large scale expression, purification, modification, western blot analysis, enzyme-linked immunosorbent assay (ELISA), antibody tagging, and fluorescent microscopy. Compliance with industry standards and regulations will be incorporated into course procedures.

Course Student Learning Outcomes

BIOL 192 Biotechnology B: Proteins Outcome Set

Outcome	
Outcome	Mapping
Outcome 1 Students will be able to write and follow standard operating procedures (SOPs).	Institutional Student Learning Outcomes: Act 2, Communicate 1, Communicate 2, Communicate 3, Learn 1, Learn 2, Learn 3, Think 1, Think 2
Outcome 2 Students will demonstrate how to obtain a purified sample of a genetically engineered protein.	Institutional Student Learning Outcomes: Act 1, Act 2, Communicate 1, Communicate 2, Communicate 3, Learn 1, Learn 2, Think 1, Think 2

2014-2015 Assessment Cycle

Measurements

Outcomes and Measures

BIOL 192 Biotechnology B: Proteins Outcome Set

Outcome

Outcome 1

Students will be able to write and follow standard operating procedures (SOPs).

▼ **Measure:** Means of assessment 192
Course level; Direct - Exam

Description of Measurement Tool:

Criteria for Success: Individual & Collective Student Criterion:

Cycle of Assessment: Spring 2016

Who is Responsible for Assessment Activity?: Faculty currently teaching the course.

Outcome 2

Students will demonstrate how to obtain a purified sample of a genetically engineered protein.

▼ **Measure:** Means of assessment 192
Course level; Direct - Exam

Description of Measurement Tool: A combination of two measures were used to assess this SLO:

- 1: Three multiple choice exam questions were embedded in the lecture final exam.
- 2: Submitting a tube containing purified Green Fluorescent Protein (GFP).

Criteria for Success: Individual & Collective Student Criterion: Success for this student learning outcome will be assessed by the total number of students who score at or above the benchmark value.

"Success" will be defined here as the ability of 70% or more of the class to score at or above the benchmark value on the test questions and the ability to independently produce a quantity of purified GFP protein for submission.

Since the ability to perform this procedure and the ability to demonstrate an understanding of the purpose of all steps, chemical compounds, and equipment used represents a cumulative synthesis of all procedures learned from throughout the semester, the benchmark for this assessment is set very high.

The benchmark value for this assessment has been set at an overall total score of 100% for the subset of the 3 multiple choice questions embedded in the final lecture exam and 100% (passing) status for the ability to isolate GFP following the series of lab procedures for that purpose.

Cycle of Assessment: Spring 2015

Who is Responsible for Assessment Activity?: Faculty currently teaching the course.

Findings

Finding per Measure

BIOL 192 Biotechnology B: Proteins Outcome Set

Outcome

Outcome 1

Students will be able to write and follow standard operating procedures (SOPs).

▼ **Measure:** Means of assessment 192
Course level; Direct - Exam

Description of Measurement Tool:

Criteria for Success: Individual & Collective Student Criterion:

Cycle of Assessment: Spring 2016

Who is Responsible for Assessment Activity?: Faculty currently teaching the course.

Findings for Means of assessment 192

No Findings Added

Outcome 2

Students will demonstrate how to obtain a purified sample of a genetically engineered protein.

▼ **Measure:** Means of assessment 192
Course level; Direct - Exam

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Since the ability to perform this procedure and the ability to demonstrate an understanding of the purpose of all steps, chemical compounds, and equipment used represents a cumulative synthesis of all procedures learned from throughout the semester, the benchmark for this assessment is set very high.

The benchmark value for this assessment has been set at an overall total score of 100% for the subset of the 3 multiple choice questions embedded in the final lecture exam and 100% (passing) status for the ability to isolate GFP following the series of lab procedures for that purpose.

Cycle of Assessment: Spring 2015

Who is Responsible for Assessment Activity?: Faculty currently teaching the course.

Findings for Means of assessment 192**Summary of Findings:** Multiple choice question 1 of 3:

This question assessed the students' ability to demonstrate their understanding of the purpose of the different buffers in a critical step in the protein purification procedure.

Total # Students Tested: 7
Students Passing: 5
% Students Passing: 71.4%

Multiple choice question 2 of 3:

This question assessed the students' ability to demonstrate their understanding of the purpose of the different protein purification procedures and the correct application of each.

Total # Students Tested: 7
Students Passing: 5
% Students Passing: 71.4%

Multiple choice question 3 of 3:

This question assessed the students' ability to demonstrate their understanding of the initial steps required for protein isolation from living cells.

Total # Students Tested: 7
Students Passing: 7
% Students Passing: 100.0%

Protein purification:

After performing a series of successive lab procedures (including the aseptic preparation of 3% TSB and 4% TSA non-selective and selective growth media enriched with arabinose and ampicillin, isolating and culturing Escherichia coli bacteria in this media, transformation of the bacteria with pGLO plasmid, lysis of cells, preparation of buffers, columns, and hydrophobic interaction media to perform liquid chromatography to isolate and purify green fluorescent protein) each student either passed (100%) or failed (0%) in their ability to independently produce a tube containing the purified GFP protein.

Total # Students Tested: 7
Students Passing: 6
% Students Passing: 85.7%

Results: Criteria for Success Achievement Status: Met

Analysis of Findings: Based on the criteria of success for this assessment, this class was successful in demonstrating proficiency in this student learning outcome.

71.4% (5 out of 7) students scored a total of 100% on this subset of 3 multiple choice questions embedded in the lecture final exam and also passed (scored 100%) in their ability to purify the GFP protein and met the benchmark.

Recommendations: This is the first time this class has been offered at this campus and the class size was small. Current teaching methods used in this course appear to be effective and will be continued and improved upon where applicable. Data gathering will continue the next time this class is offered to add to the pool of data.

Overall Recommendations

No text specified

Plans of Action

Status Reports

2013-2014 Assessment Cycle

 **Measurements**

 **Findings**

 **Plans of Action**

 **Status Reports**

2012-2013 Assessment Cycle

 **Measurements**

 **Findings**

 **Plans of Action**

 **Status Reports**