

Course Outcomes Guide

Directions: Please complete this form to document your progress toward improving student learning. For each item, indicate your progress and your anticipated next steps. Thank you!

Course/Program Title: BTC-101 Introduction to Biotechnology/ Biotechnology Program

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Expected Learning Outcomes

1. Student will be able to relate aspects of biotechnology to societal services and personal career choices.
2. Students will apply a basic core of scientific and quantitative knowledge in problem-solving and knowledge of biological molecules.
3. Students will use computers to access scientific information, analyze and solve problems and explore ethical issues in biotechnology.
4. Students will access, process, analyze and synthesize scientific information.

Assessment (How do or will students demonstrate achievement of each outcome? Please attach a copy of your assessment electronically.)

- Relate aspects of biotechnology to society and personal career choices.
 - Discuss various career options during lectures throughout semester.
- Apply a basic core of scientific and quantitative knowledge in problem-solving and biotechnology procedures.
 - Students are required to do homework assignments with questions designed to train them in problem solving skills.
 - Quantitative knowledge is assessed by calculation based in-class and homework assignments
 - Core knowledge of biotechnology procedures is assessed by exams that measure the student's knowledge and understanding of the fundamental principals of basic biotechnology
- Use technology to access scientific information, generate and analyze empirical data, and solve problems.
 - Students will exhibit mastery of basic skills required for employment in biotechnology including: mathematical problem solving, pipetting, and solution preparation.
 - Compare and contrast the structure and function of nucleic acids and proteins and the processes used to study them.
- Common assessment exam given at the end of the semester to compare student learning between courses taught by different instructors.

Validation (What methods have you used or will you use to validate your assessment?)

- TBD

Results (What do your assessment data show? If you have not yet assessed student achievement of your learning outcomes, when is assessment planned?)

- Career Exploration
 - Students were given two homework assignments to allow them to explore career choices in biotechnology. Average grades for the homework assignments were 95% and 96% respectively. In the first assignment, students were asked to write a one page paper about a career in biotechnology that they found interesting. The second assignment asked them to go to the following website: <http://biotech-careers.org/videos>, and pick two videos from the website. They were to write a summary about one video that described a career they did like and one that they did not like.
- Apply Scientific and Quantitative Knowledge
 - During Spring 2012, the average score on homework assignments using calculations was 81.6%. During Summer 2012 it was 92.4%.
 - During Spring 2012, the average score on exams were 73.4%. During Summer 2012 it was 85.2%.
- Use technology to access scientific information, generate and analyze empirical data, and solve problems. (General Education Outcome)
 - General education assessment questions piloted for final common assessment in Spring 2012. See results below

Question #	51	52	53	54	55
# Correct Answers	13	8	0	14	12
% Correct Answers	93%	57%	0%	100%	86%

- General education assessment questions given as a preliminary test in the beginning and as a final at the end of the Summer 2012 semester. See results below

Pre-Test (n = 24)

Question #	46	47	48	49	50
# Correct Answers	20	12	6	18	12
% Correct Answers	83%	50%	25%	75%	50%

Post-Test (n = 24)

Question #	46	47	48	49	50
# Correct Answers	24	17	2	22	17
% Correct Answers	100%	71%	8%	92%	71%

Change in correct answers

Question #	46	47	48	49	50
% Change in Answers	+17%	+21%	-17%	+17%	+21%

- **Common Assessment**

- Initial evaluation of the common assessment exam in 2009 led to a modification of phrasing in some of the exam questions due to a large percentage of incorrect answers. Follow up analysis showed this problem has been corrected.
- Comparison of the common assessment exam scores to the students' average exam grade score in the class showed a direct correlation in grades.
- In Fall 2010, the average grade on the common assessment final exam was 82%. In the Spring of 2011, the average grade was 76%. In Fall 2011 the average grade was 75%.
- Comparison of the overall student average for the common assessment exam given at the beginning of the Spring 2012 semester (53%) to that at the end of the semester (85%) showed an increase of 32%.
- Comparison of the overall student average for the common assessment exam given at the beginning of the Summer 2012 semester (62%) to that at the end of the semester (87%) showed an increase of 25%.

Follow-up (How have you used or how will you use the data to improve student learning?)

- Initial common assessment data for BTC-101 was viewed and modifications to the questions being asked to improve phrasing and level of difficulty were made in 2009. New instructors are now teaching this course and will review the common assessment and try to tailor the questions to their syllabi and teaching content.
- Question # 48 on assessment given in Spring and Summer 2012 was recognized as being confusing for the students and was changed for the fall semester 2012.

Budget Justification (What resources are necessary to improve student learning?)

None at this time.