

## End of Year Assessment Report for Programs

Program: Biology

Semester/year: 2019/2020

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### Program Mission Statement

The Department of Biology is committed to excellence. Our mission is two-fold. First, preparing graduates in the biological sciences who demonstrate open-minded inquiry, integrity, service, and stewardship of God's creation. Second, helping students in the liberal arts better understand and appreciate their role in God's created order. We see this commitment as an affirmation of the mission of Greenville University.

### Program Objectives

1. Think like a biologist
  1. Demonstrate working knowledge of major areas of biology as identified in the biology major (cellular/molecular, anatomical, ecology).
  2. Describe ethical dimensions of biological issues and articulate links between the study of biology and a Christian worldview.
2. Work like a biologist
  1. Design studies, collect and analyze data to answer biological questions
  2. Appropriately utilize scientific literature
  3. Demonstrate standard laboratory skills
3. Communicate like a biologist
  1. Orally present scientific information effectively
  2. Communicate scientific information in written form effectively

## Assessment Methods and Benchmarks – FULL YEAR

For each program objective, choose one “best representative” assignment at the Introductory, Developmental, and Mastery levels. You will have a total of three assignments/measurements per program objective. Put this information in a chart. Refer back to your Program Learning Objective Alignment Chart to determine best representative assignments and benchmarks. In any given semester, you may not have assignments at all three levels for every program objective; simply report all that you can.

Program Objective	Introducing	Developing	Mastering
1.1. Think like a biologist: Demonstrate working knowledge of major areas of biology as identified in the biology major (cellular/molecular, anatomical, ecology).	BIOL110; Relevant questions on Final exam (raw scores). Benchmark: >=50% & 64% (Fa & Sp)*** Evidence: 38% & 60% (Fa & Sp)	BIOL370; Average of exams (excluding first exam) and lab grades. Benchmark: >=70% Evidence: 88%	Not yet mapped
1.2. Think like a biologist: Describe ethical dimensions of biological issues and articulate links between the study of biology and a Christian worldview.	Introduced in THEO 110	UNIV301: Term paper or mid-term grade Benchmark: >= 70% Evidence: 100% (16/16)	BIOL410 CLO Faith/Ethics reflection paper** Benchmark: >=70% Evidence: 100%

\* 6 students did not take the final exam; their scores were calculated from relevant questions on previous exams. This also includes one student who recently withdrew due to military service.

\*\* 100% of students who completed the assignment (17/24); 7/24 students did not complete the assignment

\*\*\* Calculated on pre-curve exam scores. The benchmarks used here were reduced from 70% by the curve used for the final exam in each section, so a 50% on the Spring final was curved to 70%.

## Analysis of Assessment Findings – FULL YEAR

Discuss the significance of the findings of the current semester in light of the desired results, findings from previous semesters/years, recent changes in the program or the assessment process, etc. What did you learn from the assessment? In particular:

(1) What strengths and weaknesses do the findings reveal about the program and/or the assessment process?

- a. The assessment data for year 1 (Program Objective 1.1 and 1.2) shows that, **assuming our assessment items are assessing what we want them to**, we are doing a good job on PO 1.2, but need to work on PO 1.1 a bit more.
- b. Both the good news (1.2) and the bad news (1.1) may be affected by particulars of the assessment process – grades used in UNIV 301 may not be specific only to this PO. We may ultimately need to develop a rubric for PO 1.2 and have instructors forward Bio majors assignments to us for assessment, rather than relying on the grade given by the instructor, which may include aspects other than this PO. May need to rethink the BIO 110 assessment (possible problems and solutions). This implies some degree of extra work.
- c. As noted last year this assessment process is an exercise in conflicting goals: To maximize assessability, program objectives need to be specific and granular. This implies the need for many program objectives to span all the goals of a robust academic program. However, the mandate to assess each objective at three levels (I, D, M) suggests fewer learning objectives. Furthermore the three-level assessment suggest that there should be three similar assignments to closely match a given program objective. Pushing in the opposite direction are the need to streamline the assessment process (driven in part by the deep desire of faculty to spend more time teaching and less time on paperwork), and the need to allow courses and assignments to develop and improve. *These conflicting goals are fundamental to this model of assessment! Educating students is not like manufacturing widgets, and as long as we try to assess learning like we are running an assembly line, we will have this problem. The best we can do under this model is an unhappy truce between these conflicting objectives.*

(2) What impact have program changes in the last several years had on student learning (indicate those program changes that resulted from previous assessment findings)?

- a. For the 2019/2020 academic year we shifted the BIO 110 and BIO 112 courses from Campbell Biology. (sued for 7+ years) to the OpenStax textbook, which is freely available to students as a pdf. We anticipate that this will improve student access to the text. At the same time, the instructor for Both sections of BIOL 110 this year was different from the two instructor(s) who taught this course last year, making it difficult to determine how the textbook may or may not affect students.

(3) What impact have recent changes in the assessment process had on the quality and usefulness of the findings? Of particular importance to note are recent changes and improvements in the program that resulted from previous assessment efforts. **(NOTE: The two sentences of this prompt don't seem to be related – the first is about changes in the assessment process and the second is about changes in the program.)**

- a. The % passing for PO 1.1 at the “I” level is much lower in 2019/20 than the previous year. This reflects the switch from a lab activity grade item used in 2018/19 to a composite of exam items used in 209/20. We feel the composite of exam items is a more representative assessment, if more stringent.
- b. The assessment of PO 1.2 at the “I” level has been changed. We are going to count on this being introduced in the General Education required course THEO 110. Since this is a prerequisite for both the other required GE courses in the area of Christian Foundations, students should be taking in their first or second semester. The assessment used in 2018/19 was an exam grade on one exam in a 300 level course, which was largely about antibiotics, and only tangentially touched on ethics. We determined this was not an appropriate assessment tool for this PO.

## Sharing and Discussion of Assessment Findings – FULL YEAR

We spent time in several department meetings this year defining particular skills that our lab curriculum should develop in our students, and mapping these to specific lab activities across the lab curriculum.

Given the conflicting goals noted above, most of our program improvements continue to be driven by our own anecdotal observations.

We had started discussing whether statistics should be a prerequisite for BIOL 370. This is not something that shows up in the assessment tables, but it shows up in the extra hours spent trying to help students understand the data-intensive labs. However, this discussion has been tabled for now because our attention has turned to several other things: chiefly the whole pandemic thing, UNIV101, and personnel transitions and searches in the department.

Having UNIV101 taught by biology faculty, while it's not without significant costs and drawbacks, does present some opportunities. These are still fairly undefined but hopefully over the summer we can better define these and build the syllabus accordingly.

### **Use of Assessment Findings for Program Improvement (Action Plan) - FULL YEAR**

*(A) Describe any changes in (1) the program and/or (2) the assessment process that are planned in response to these assessment findings.*

(A.1)

- 1) We still need to determine the feasibility of some type of external test to assess PO 1.1 at the "M" level. The biology curriculum in its current form is not linear enough to allow anything other than BIOL 410 to serve as a "final" course, and 410 is already pretty heavily represented in the assessment plan.
- 2) For PO 1.1 at the "I" level, we may want to specify topical areas that exam questions will focus on. We may also want to expand this to include exam items from BIOL 112, to spread this across multiple instructors/courses (not clear if this is a good plan or not).

(A.2) As noted above, we need to work with instructors in UNIV 301 to determine a more specific method to assess PO 1.2 at the "D" level. One option is to create a rubric that we can use to evaluate the assignments in UNIV 301 and BIOL 410.

*(B) Briefly summarize the status of the previous years' or semester's action plans. Are they complete, still being implemented, on hold, or some other status?*

The goals identified in last year's action plan are listed here with comments.

- 1) The scheduling of BIOL 340 and BIOL 360 have been reversed, to allow 360 (Microbiology) to become a prerequisite for BIOL 340 (Cell Biology). The pandemic - based disruptions to planned labs have made it difficult to fully tell if this was effective. Anecdotally, the instructor reports students who have had BIOL 360 prior to 340 demonstrate better sterile technique, and are better at troubleshooting contamination when it does occur.
- 2) Work is ongoing to standardize BIOL 395/405 across multiple instructors. It may be ideal to have a single section with multiple faculty so that we can ensure that each of us is checking in on our students.
- 3) We did not include oral presentations in this year's BIOL 395/410, but would still like to do so, if we can find a format in which this can occur - the end-of-term schedule is not conducive to this.
- 4) The list of laboratory skills has been created and mapped across the lab curriculum. We have still not defined how to assess these skills.
- 5) The BIOL 110/112 textbook was changed; changes in instructors make it difficult to objectively determine if this has led to better student learning.
- 6) The disruptions in Spring 2020 prevented us from completing the revision of BIOL 390

*(C) For each intended improvement or change in the program stemming from this semester's data, provide a detailed timeline for follow-up data collection, data analysis, and data review.*

- 1) Determine how to assess the success of learning of defined lab skills (Fall 2020).
- 2) Complete revision of BIOL 390 to include a standard gradebook, with rubrics. (Fall 2020)

- 3) Determine if external normed test can be incorporated into BIOL 410 – issue to be addressed include cost and exploring incentives and disincentives to student performance on such an exam. (Fall 2020)
- 4) Develop a more specific and repeatable assessment of PO 1.1 in BIOL 110 and (possibly) BIOL 112 (Spring 2021).

**Full Year Reflection – FALL/INTERTERM/SPRING TERMS**

See above

**Supporting Documents**

[If you attach any supporting documents, please list them here. You may submit these supporting documents into the D2L dropbox.]