## Biology BA/Minor– School of Sciences and Mathematics

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<th>Outcome</th>
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<td>SLO1: At the end of the foundation sequence (BIOL 111, BIOL 112, BIOL 211) students demonstrate the ability to apply knowledge of the core concepts and competencies in biology to classify, explain and interpret biological phenomena. Core concepts include the biology of the cell, biochemistry, molecular biology, genetics, developmental biology of multicellular organisms, physiology of multicellular organisms, anatomy of animals, anatomy of plants, evolution, ecology, conservation biology, population biology, and biodiversity. Core competencies include the ability to interpret experimental and observational data regarding the core concepts.</td>
<td><strong>Measure 1:</strong> The standardized subject exam in biology (Major Fields Test – Biology (MFT); developed by the Educational Testing service) will be given annually to students at the beginning and end of the foundation sequence. The assessed students representing the pre-instruction period will be assigned from randomly laboratory selected sections from Biology 111 (the beginning of the foundation sequence). Biology 111 laboratory sections are drawn from across Biology 111 lecture sections, and thus represent a diverse cross-section of Biology 111 sections. Figure 1 illustrates the relationship of Biology 111 laboratories and lectures. College of Charleston 10/18/2016 3:27 PM Figure 1. Organization of Biology 111 Lectures and Laboratories The students representing the post-instruction group will be selected from Biology 211 sections. Students will be chosen so that they are drawn from multiple Biology 211 lecturers. Between 50-100 students will be sampled for each of the pre- and post-instruction assessments. This measure represents a pre- and post-test assessment. Students taking the exam at the beginning of Biology 111 represent student performance before the foundation sequence, and students taking the exam at the end of Biology 211 represent performance after the foundation sequence. Students and cohorts of students taking the MFT are given a raw overall score, subject- specific subscores, and corresponding percentile scores. Percentiles are based on a nationwide pool of seniors graduating from accredited institutions of higher education. The Major Fields Test in biology is described at the following URL: <a href="https://www.ets.org/mft/about/content/biology">https://www.ets.org/mft/about/content/biology</a> <strong>Performance Target:</strong> At the end of Biology 211 (post-instruction), the cohort of students will have improved by 18 percentile points in their overall MFT score compared with the cohort of pre-instruction students (taking the exam at the beginning of Biology 111). This target is unchanged from 2016-2017. In 2016-2017, scores declined from 2015-2016, and failed to meet the 2017 target. Whether this result represents a true decline or stochastic variation is unclear, however, as we have insufficient data.</td>
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SLO2: Students who have completed the Biology BA will have continued beyond the foundation sequence, completed a genetics lecture course, and additional lecture and laboratory classes within biology. Additional coursework in chemistry and mathematics will have been completed. At the end of the program Biology BA majors demonstrate additional improvement in their ability to apply knowledge of the core concepts and competencies of biology to classify, explain and interpret biological phenomena. Core concepts include the biology of the cell, biochemistry, molecular biology, genetics, developmental biology of multicellular organisms, physiology of multicellular organisms, anatomy of animals, anatomy of plants, evolution, ecology, conservation biology, population biology, and biodiversity. Core competencies include the ability to interpret experimental and observational data regarding the core concepts. Improvements in core competencies and understanding core concepts will result in students that have performances on standardized exams surpassing the average performance of graduating seniors across the United States. Students completing the program will indicate that they have had a satisfactory education in the biological sciences.

**Measure 1:** The MFT will be given annually to students who are recruited from a random subsample of the graduating senior BA biology majors. Students will demonstrate improvement in their ability to apply knowledge of the core concepts and competencies of biology to classify, explain and interpret biological phenomena. Students are expected to improve in their overall MFT score relative to students who have just completed Biology 211. Selection of Biology 211 students was described for Outcome 1. For this comparison, Biology 211 students will represent the pre-instruction group, and the graduating seniors will represent the post-instruction group. The Major Fields Test in biology is described in Outcome 1 and at the following URL: https://www.ets.org/mft/about/content/biology?

**Performance Target:** The cohort of post-instructional students will have improved 32 percentile points (cohort mean percentile) in comparison to the pre-instructional students. This target is unchanged from 2017-2018. In 2017-2018, scores declined from 2016-2017, and failed to meet the target. This decline, while alarming, is difficult to distinguish from stochastic year-to-year variation, given the small sample sizes for graduating seniors, without additional data.

**Measure 2:** Students will complete a subject survey that is incorporated into the College of Charleston graduating senior survey. The subject survey will ask students whether they perceive that they have received a rigorous education in the biological sciences.

**Performance Target:** At least 92% of students will indicate they have received a rigorous education in the biological sciences. This target is unchanged from 2017-2018. Although the target was met in 2017-2018, it was the first year in which the survey featured clarified wording for the survey question, and due to an error of administration, the survey was decoupled from the Senior Exit Survey, resulting in a low response rate. We will assess this measure with a larger sample in 2018-2019 before making any changes.
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| SLO3: At the end of the program Biology BA students demonstrate the ability to communicate biological explanations and interpretations in the standard vernacular and style of the biological sciences. Examples of communication methods include oral presentations, slideshow presentations, poster presentations, written lab reports, and written biological essays. These communications will discuss biological phenomena, experimental designs, results, analysis and/or persuasive argument. | **Measure 1:** Biology 211 includes a discussion component that is designed, in part, to teach scientific communication skills. All biology majors are required to complete Biology 211. For this assessment measure, students will be evaluated for their performance on an activity that the instructor designates as involving scientific communication. An example assignment and rubric can be found in the 2016-2017 BS Biology assessment plan.  
**Performance Target:** The desired level of performance is at least a 70% score on the assignment. The target is that 85% of students will meet or exceed the desired level of performance. This target is increased from 2017-2018, as we met the previous target (80%) this year, which was the first year collecting these data.  
**Measure 2:** BA Biology students will present research findings at campus, regional, national or international meetings during the academic year. Students will be counted at campus meetings, and biology faculty will be surveyed to assess student participation in regional, national or international meetings.  
**Performance Target:** At least 5 BA Biology students will present research findings as described above. This target is unchanged from 2017-2018, when the target was missed by a single student. Now that the downtown faculty have re-established their labs in RITA, we expect the number of students engaged in research to increase. |