

Mission / Purpose

The Bachelor of Science degree in Biological Sciences is designed to provide an undergraduate education that prepares the student to pursue a professional post-baccalaureate degree and/or to enter the workforce with skills necessary for lifelong professional achievement.

Student Learning Outcomes/Objectives, with Any Associations and Related Measures, Targets, Findings, and Action Plans

SLO 1: Understanding of the scientific process

Students will develop an understanding of the scientific process.

Related Measures:

M 1: Entry-Level Assessment (Laboratory Report)

Entry-level assessment: Students enrolled in BSC 110L (Principles of Biological Sciences I Laboratory) and BSC 111L (Principles of Biological Sciences II Laboratory) complete laboratory exercises that introduce students to scientific methodology and evaluation of scientific research.

Source of Evidence: Written assignment(s), usually scored by a rubric

Target:

70% of students receive an overall score of average (70%) or better using the rubric designed to assess written laboratory reports. The rubric addresses content and format. The cohort is separated into students seeking the B.S. in Biological Sciences, the B.S. in Biological Sciences (Licensure), or the B.S. in Marine Biology.

Findings (2011-2012) - Target: Partially Met

Fall 2011:

Hattiesburg: In the BSC 110L course, 59.9% (n = 143) of students seeking a B.S. in Biological Sciences scored 70% or greater on a lab report. Lab reports were evaluated for content and format using a specified rubric. In the BSC 111L course 77.3% (n = 44) of students seeking a B.S. in Biological Sciences scored 70% or greater on a lab report. Lab reports were evaluated for content and format using a specified rubric.

Gulf Coast: In the BSC 110L course, 100% (n = 13) of students scored 70% or greater on a lab report. Lab reports were evaluated for content and format using a specified rubric. Data was not separated by degree plan. BSC 111 is not offered on this campus in the Fall semester.

Spring 2012:

Hattiesburg: In the BSC 110L course, 31.4% (n = 35) of students seeking a B.S. in Biological Sciences scored 70% or greater on a lab report. Lab reports were evaluated for content and format using a specified rubric. In the BSC 111L course 36.0% (n = 83) of students seeking a B.S. in Biological Sciences scored 70% or greater on a lab report. Lab reports were evaluated for content and format using a specified rubric.

Gulf Coast: BSC 110 is not offered on this campus in the Spring semester. In the BSC 111L course, 94.7% (n = 38) of students scored 70% or greater on a lab report. Lab reports were evaluated for content and format using a specified rubric. Data was not separated by degree plan.

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

Counsel students on writing

Established in Cycle: 2011-2012

In these introductory courses, students' writing ability may not be well developed. Introducing students who are not performin...

M 2:Upper Division Assessment (Laboratory Report)

Upper Division Coursework Assessment: Students enrolled in BSC 380L (Microbiology Lab) complete two formal laboratory reports that require students to explain scientific methodology and to evaluate scientific research.

Source of Evidence: Written assignment(s), usually scored by a rubric

Target:

70% of students receive a rating of average (70%) or better on each report using the rubric designed to assess the formal laboratory report. The rubric addresses content, format, and style. The cohort is separated into students seeking the B.S. in Biological Sciences, the B.S. in Biological Sciences (Licensure), or the B.S. in Marine Biology.

Findings (2011-2012) - Target: Met

Fall 2011:

Hattiesburg: In BSC 380L, 94% (n = 32) of students seeking a B.S. in Biological Sciences scored 70% or greater on the first formal laboratory report as determined using a rubric designed to assess content, format, and style. 97% (n = 32) of students seeking a B.S. in Biological Sciences scored 70% or greater on the second formal laboratory report as determined using a rubric designed to assess content, format, and style.

Gulf Coast: In BSC 380L, 93% (n = 14) of students seeking a B.S. in Biological Sciences scored 70% or greater on the two formal laboratory reports as determined using a rubric designed to assess content, format, and style.

Spring 2012:

Hattiesburg: In BSC 380L, 81% (n = 42) of students seeking a B.S. in Biological Sciences scored 70% or greater on the first formal laboratory report as determined using a rubric designed to assess content, format, and style. 76% (n = 42) of students seeking a B.S. in Biological Sciences scored 70% or greater on the second formal laboratory report as determined using a rubric designed to assess content, format, and style.

Gulf Coast: BSC 380 is not offered on the Gulf Coast in the Spring.

M 11:Upper Division Self-Assessment (Content / Process)

Upper Division Coursework Assessment: During Spring semester, a sample of third year students who have taken BSC 370 (Genetics) and BSC 380/380L (Microbiology and Lab) completes an informal instrument that allows self-assessment of Biology content knowledge and understanding of the scientific process.

Source of Evidence: Academic indirect indicator of learning - other

Target:

Using a 5 point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree): 80% of students indicate 4 or above that their understanding of the scientific process has increased.

The cohort is separated into students seeking the B.S. in Biological Sciences, the B.S. in Biological Sciences (Licensure), or the B.S. in Marine Biology.

Findings (2011-2012) - Target: Met

Spring 2012:

Hattiesburg: 100% (n = 3) of students enrolled in BSC 370 (Genetics) who have also completed BSC 380 (Microbiology) indicated 4 or 5 on the survey that their understanding of the scientific process has increased.

Gulf Coast: The survey was not administered in this section of BSC 370.

M 12:Capstone Course Survey (Student Self-Assessment)

Students enrolled in BSC 497 (Senior Practicum) complete an informal instrument that allows self-assessment of content knowledge, understanding of the scientific process, development of technical skills and skills in written and oral communication, and satisfaction with their qualifications for employment or post-graduate positions.

Source of Evidence: Student satisfaction survey at end of the program

Target:

Using a 5 point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree): 75% of students indicate 4 or above that their understanding of the scientific process increased.

Findings (2011-2012) - Target: Met

Fall 2011:

Hattiesburg: 84.2% (n = 19) of students seeking the B.S. in Biological Sciences indicated 4 or above that their understanding of the scientific process increased.

Gulf Coast: The survey was not administered in this section of BSC 497.

Spring 2012:

Hattiesburg: 92.3% (n = 13) of students seeking the B.S. in Biological Sciences indicated 4 or above that their understanding of the scientific process increased.

Gulf Coast: The survey was not administered in this section of BSC 497.

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

Implement Online Survey

Established in Cycle: 2011-2012

To increase the number of BSC 497 students completing the exit survey, an online delivery method will be implemented. This will ...

SLO 2:Broad-based knowledge of Biology

Students will acquire broad-based content knowledge of Biology, namely: Understanding the characteristics that unite living organisms; understanding diversity of life; understanding the similarities and differences among organisms, i.e., systematics; understanding the relationship between structure and function at all levels of organization; understanding the physical and chemical properties of organisms and processes that occur in living things; understanding the cellular basis of life; understanding the nature and function of the gene and the flow of genetic information in the cell, the organism, and the population; understanding homeostatic control mechanisms that allow organisms to respond to changes in the internal and external environment; understanding the interdependence and interrelationships among organisms and between organisms and their

environment; understanding the origin of life and the process of evolution; understanding the historical background leading to contemporary views on major biological topics and awareness of the dynamic processes of scientific inquiry.

Related Measures:

M 3:ETS Major Field Test in Biology

Students enrolled in the capstone course BSC 497 (Senior Practicum) take the Educational Testing Service (ETS) Major Field Test in Biology, which is designed to assess mastery of concepts, principles, and knowledge in biology expected of students at the conclusion of their undergraduate curriculum. ETS reports total scores and four sub scores: 1) Cell Biology, 2) Molecular Biology and Genetics, 3) Organismal Biology, and 4) Population Biology, Evolution, and Ecology. Results from the ETS Major Field Test in Biology provide an assessment of our students' achievement against national comparative data.

Source of Evidence: Standardized test of subject matter knowledge

Target:

75% of students score in the 50th percentile or above in at least two of the four sub disciplines of the Major Field Test. During their undergraduate career, students choose among several "required elective" upper level Biology courses that typically fall within two or more of the sub disciplines assessed by the Major Field Test.

Findings (2011-2012) - Target: Not Met

Fall 2011:

Hattiesburg: 50% (n = 38) of students seeking a B.S. in Biological Sciences scored in the 50th percentile or above in at least two of the four sub disciplines of the Major Field Test.

Gulf Coast: 71% (n = 7) of students in the BSC 497 course scored in the 50th percentile or above in at least two of the four sub disciplines of the Major Field Test.

Spring 2012:

Hattiesburg: 64.2% (n = 53) of students seeking a B.S. in Biological Sciences scored in the 50th percentile or above in at least two of the four sub disciplines of the Major Field Test.

Gulf Coast: 50% (n = 12) of students in the BSC 497 course scored in the 50th percentile or above in at least two of the four sub disciplines of the Major Field Test.

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

Increase Student Preparation for Exam

Established in Cycle: 2011-2012

Over the past few years, we have seen a small increase in student performance on this standardized exam. The BSC Assessment Co...

M 4:Upper Division Assessment (Exam Questions)

Upper Division Coursework Assessment: Students enrolled in BSC 370 (Genetics) or in BSC 380 (Microbiology) demonstrate an understanding of course-specific content.

Source of Evidence: Academic direct measure of learning - other

Target:

In BSC 370 (Genetics), 70% of students are able to explain course-specific concepts at the level of

70% or better; answers to selected essay questions on two in-class written exams are assessed. In BSC 380 (Microbiology), 70% of students score 70% or better on the comprehensive final exam, which comprises questions designed to assess understanding of course-specific concepts. In both courses, answers are graded subjectively by the instructor and the cohort is separated into students seeking the B.S. in Biological Sciences, the B.S. in Biological Sciences (Licensure), or the B.S. in Marine Biology.

Findings (2011-2012) - Target: Partially Met

Fall 2011:

Hattiesburg: In BSC 370 (Genetics) 66% (n = 70) of students seeking a B.S. in Biological Sciences scored 70% or greater on exam questions addressing course-specific concepts. In BSC 380 (Microbiology) 86% (n = 35) of students seeking a B.S. in Biological Sciences scored 70% or greater on the comprehensive final exam.

Gulf Coast: BSC 370 (Genetics) is not offered on the Gulf Coast campus during the fall semester. In BSC 380 (Microbiology) 87% (n = 15) of students seeking a B.S. in Biological Sciences scored 70% or greater on the comprehensive final exam.

Spring 2012:

Hattiesburg: In BSC 370 (Genetics) 39% (n = 18) of students seeking a B.S. in Biological Sciences scored 70% or greater on exam questions addressing course-specific concepts. In BSC 380 (Microbiology) 71% (n = 42) of students seeking a B.S. in Biological Sciences scored 70% or greater on the comprehensive final exam.

Gulf Coast: In BSC 370 (Genetics) 58.9% (n = 25) of students seeking a B.S. in Biological Sciences scored 70% or greater on exam questions addressing course-specific concepts. BSC 380 is not offered on the Gulf Coast in the Spring.

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

Reconsideration of Upper Level Assessment criteria

Established in Cycle: 2011-2012

Currently, this measure is based on the performance of students in a specific course (Genetics or Microbiology). The BSC Asses...

M 11: Upper Division Self-Assessment (Content / Process)

Upper Division Coursework Assessment: During Spring semester, a sample of third year students who have taken BSC 370 (Genetics) and BSC 380/380L (Microbiology and Lab) completes an informal instrument that allows self-assessment of Biology content knowledge and understanding of the scientific process.

Source of Evidence: Academic indirect indicator of learning - other

Target:

Using a 5 point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree): 80% of students indicate 4 or above that their biology content knowledge increased after taking both courses. 80% of students indicate 4 or above that their understanding of the scientific process has increased. The cohort is separated into students seeking the B.S. in Biological Sciences, the B.S. in Biological Sciences (Licensure), or the B.S. in Marine Biology.

Findings (2011-2012) - Target: Met

Spring 2012:

Hattiesburg: 100% (n = 3) of students enrolled in BSC 370 (Genetics) who have also completed BSC 380 (Microbiology) indicated 4 or 5 on the survey that their biology content knowledge increased after taking both courses.

Gulf Coast: The survey was not administered in this section of BSC 370.

M 12: Capstone Course Survey (Student Self-Assessment)

Students enrolled in BSC 497 (Senior Practicum) complete an informal instrument that allows self-assessment of content knowledge, understanding of the scientific process, development of technical skills and skills in written and oral communication, and satisfaction with their qualifications for employment or post-graduate positions.

Source of Evidence: Student satisfaction survey at end of the program

Target:

Using a 5 point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree): 75% of students indicate 4 or above that their content knowledge of Biology increased.

Findings (2011-2012) - Target: Met

Fall 2011:

Hattiesburg: 89.5% (n = 19) of students seeking the B.S. in Biological Sciences indicated 4 or above that their content knowledge of Biology increased.

Gulf Coast: The survey was not administered in this section of BSC 497.

Spring 2012:

Hattiesburg: 92.3% (n = 13) of students seeking the B.S. in Biological Sciences indicated 4 or above that their content knowledge of Biology increased.

Gulf Coast: The survey was not administered in this section of BSC 497.

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

Implement Online Survey

Established in Cycle: 2011-2012

To increase the number of BSC 497 students completing the exit survey, an online delivery method will be implemented. This will ...

SLO 3: Skill in scientific written and oral communication

Students will exhibit effective skills in scientific writing and oral communication of scientific information.

Related Measures:

M 5: Capstone Course (Written & Oral Communication)

Capstone Assessment: Students complete BSC 497 (Senior Practicum), which is designed to assess effective written and oral communication, among other skills. Students write a total of 5,000 words and give two oral presentations.

Source of Evidence: Written assignment(s), usually scored by a rubric

Target:

70% of students receive a mean score of 70% or better using rubrics designed to assess written and

oral communication, respectively. The cohort is separated into students seeking the B.S. in Biological Sciences or the B.S. in Marine Biology.

Findings (2011-2012) - Target: Met

Fall 2011:

Hattiesburg: 86% (n = 43) of students seeking a B.S. in Biological Sciences received a mean score of 70% or better on written assignments, each evaluated using a rubric developed by the GEC committee to assess written communication. In addition, 95% (n = 43) of students seeking a B.S. in Biological Science received a mean score of 70% or better on oral assignments, each evaluated using a rubric developed by the GEC committee to assess oral communication.

Gulf Coast: 85% (n = 7) of students seeking a B.S. in Biological Sciences received a mean score of 70% or better on written assignments, each evaluated using a rubric developed by the GEC committee to assess written communication. In addition, 85% (n = 7) of students seeking a B.S. in Biological Science received a mean score of 70% or better on oral assignments, each evaluated using a rubric developed by the GEC committee to assess oral communication.

Spring 2012:

Hattiesburg: 88.7% (n = 53) of students seeking a B.S. in Biological Sciences received a mean score of 70% or better on written assignments, each evaluated using a rubric developed by the GEC committee to assess written communication. In addition, 88.7% (n = 53) of students seeking a B.S. in Biological Science received a mean score of 70% or better on oral assignments, each evaluated using a rubric developed by the GEC committee to assess oral communication.

Gulf Coast: 75% (n = 12) of students seeking a B.S. in Biological Sciences received a mean score of 70% or better on written assignments, each evaluated using a rubric developed by the GEC committee to assess written communication. In addition, 91.7% (n = 12) of students seeking a B.S. in Biological Science received a mean score of 70% or better on oral assignments, each evaluated using a rubric developed by the GEC committee to assess oral communication.

M 6: Upper Division Assessment (Science Writing)

Upper Division Coursework Assessment: Students enrolled in BSC 380L (Microbiology Lab) complete two formal laboratory reports that require students to use their scientific writing skills.

Source of Evidence: Written assignment(s), usually scored by a rubric

Target:

70% of students receive an overall score of average (70%) or better using the rubric designed to assess scientific writing. The rubric addresses content, format, and style. The cohort is separated into students seeking the B.S. in Biological Sciences, the B.S. in Biological Sciences (Licensure), or the B.S. in Marine Biology.

Findings (2011-2012) - Target: Met

Fall 2011:

Hattiesburg: In BSC 380L, 94% (n = 32) of students seeking a B.S. in Biological Sciences scored 70% or greater on the first formal laboratory report as determined using a rubric designed to assess content, format, and style. 97% (n = 32) of students seeking a B.S. in Biological Sciences scored 70% or greater on the second formal laboratory report as determined using a rubric designed to assess content, format, and style.

Gulf Coast: In BSC 380L, 93% (n = 14) of students seeking a B.S. in Biological Sciences scored 70% or greater on the two formal laboratory reports as determined using a rubric designed to assess content, format, and style.

Spring 2012:

Hattiesburg: In BSC 380L, 81% (n = 42) of students seeking a B.S. in Biological Sciences scored 70% or greater on the first formal laboratory report as determined using a rubric designed to assess content, format, and style. For the second lab report, 76% (n = 42) of students seeking a B.S. in Biological Sciences scored 70% or greater as determined using a rubric designed to assess content, format, and style.

Gulf Coast: BSC 380 is not offered on the Gulf Coast in the Spring.

M 7:Entry-Level Assessment (Science Writing)

Entry-Level Assessment: Students in enrolled in BSC 110L (Principles of Biological Sciences I Lab) and BSC 111L (Principles of Biological Sciences II Lab) complete a laboratory exercise that introduces students to scientific writing.

Source of Evidence: Written assignment(s), usually scored by a rubric

Target:

70% of students receive an overall score of average (70%) or better using the rubric designed to assess scientific writing. The rubric addresses content and format. The cohort is separated into students seeking the B.S. in Biological Sciences, the B.S. in Biological Sciences (Licensure), or the B.S. in Marine Biology.

Findings (2011-2012) - Target: Not Met

Fall 2011:

Hattiesburg: In the BSC 110L, 76.2% (n = 147) of students seeking a B.S. in Biological Sciences scored 70% or greater on the first lab report using a rubric addressing content and format. In the BSC 111L, 65.9% (n = 44) of students seeking a B.S. in Biological Science scored 70% or greater on a lab report using a rubric addressing content and format.

Gulf Coast: In the BSC 110L, 100% (n = 13) of students scored 70% or greater on lab reports using a rubric addressing content and format. Data was not sorted by degree plan. BSC 111 is not offered on this campus in the Fall semester.

Spring 2012:

Hattiesburg: In the BSC 110L, 42.4% (n = 33) of students seeking a B.S. in Biological Sciences scored 70% or greater on the first lab report using a rubric addressing content and format. In the BSC 111L, 55.4% (n = 83) of students seeking a B.S. in Biological Science scored 70% or greater on a lab report using a rubric addressing content and format.

Gulf Coast: In the BSC 111L, 94.7% (n = 38) of students scored 70% or greater on lab reports using a rubric addressing content and format. Data was not sorted by degree plan. BSC 110 is not offered on this campus in the Spring semester.

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

Counsel students on writing

Established in Cycle: 2011-2012

In these introductory courses, students' writing ability may not be well developed. Introducing students who are not performin...

M 12: Capstone Course Survey (Student Self-Assessment)

Students enrolled in BSC 497 (Senior Practicum) complete an informal instrument that allows self-assessment of content knowledge, understanding of the scientific process, development of technical skills and skills in written and oral communication, and satisfaction with their qualifications for employment or post-graduate positions.

Source of Evidence: Student satisfaction survey at end of the program

Target:

Using a 5 point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree): 75% of students indicate 4 or above that they developed the ability to communicate scientific information in writing. 75% of students indicate 4 or above that they developed the ability to communicate scientific information orally.

Findings (2011-2012) - Target: Met

Fall 2011:

Hattiesburg: 84.2% (n = 19) of students seeking the B.S. in Biological Sciences indicated 4 or above that they developed the ability to communicate scientific information in writing. 94.7% (n = 19) of students seeking the B.S. in Biological Sciences indicated 4 or above that they developed the ability to communicate scientific information orally.

Gulf Coast: The survey was not administered in this section of BSC 497.

Spring 2012:

Hattiesburg: 84.6% (n = 13) of students seeking the B.S. in Biological Sciences indicated 4 or above that they developed the ability to communicate scientific information in writing. 100% (n = 13) of students seeking the B.S. in Biological Sciences indicated 4 or above that they developed the ability to communicate scientific information orally.

Gulf Coast: The survey was not administered in this section of BSC 497.

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

Implement Online Survey

Established in Cycle: 2011-2012

To increase the number of BSC 497 students completing the exit survey, an online delivery method will be implemented. This will ...

SLO 4: Employment and professional/graduate education

Students will gain content knowledge such that they can obtain employment consistent with their interest in the biological sciences, and/or pursue professional school/graduate education, or be satisfied that the degree met other personal objectives.

Related Measures:

M 8: Employment/Professional School/Graduate Education

Student enrolled in BSC 497 (Senior Practicum) complete an Exit Survey in which they report whether or not they have found professional employment related to their major or if they will be pursuing post-graduate training or education or if they have otherwise met personal goals.

Source of Evidence: Academic direct measure of learning - other

Target:

70% of seniors surveyed during the semester they take BSC 497 (Senior Practicum) report that they have secured employment related to the major or that they have applied to a professional program (medical school, dental school, etc.) or to a graduate studies program or that they have otherwise met their personal goals. The cohort is separated into students seeking the B.S. in Biological Sciences or the B.S. in Marine Biology.

Findings (2011-2012) - Target: Met

Fall 2011:

Hattiesburg: Data was not collected on whether or not seniors had secured employment related to their major.

Gulf Coast: Data was not collected on whether or not seniors had secured employment related to their major.

Spring 2012:

Hattiesburg: 92.3% (n = 13) of the students seeking a B.S. in Biological Sciences that completed the exit survey indicated that they have secured employment related to the major or that they have applied to a professional program or to a graduate studies program.

Gulf Coast: Data was not collected on whether or not seniors had secured employment related to their major.

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

Implement Online Survey

Established in Cycle: 2011-2012

To increase the number of BSC 497 students completing the exit survey, an online delivery method will be implemented. This wil...

M 12:Capstone Course Survey (Student Self-Assessment)

Students enrolled in BSC 497 (Senior Practicum) complete an informal instrument that allows self-assessment of content knowledge, understanding of the scientific process, development of technical skills and skills in written and oral communication, and satisfaction with their qualifications for employment or post-graduate positions.

Source of Evidence: Student satisfaction survey at end of the program

Target:

Using a 5 point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree): 75% of students indicate 4 or above that they are satisfied with their qualifications for professional employment or for post-graduate positions.

Findings (2011-2012) - Target: Partially Met

Fall 2011:

Hattiesburg: 52.6% (n = 19) of students seeking the B.S. in Biological Sciences indicated 4 or above that they are satisfied with their qualifications for professional employment or for post-graduate positions.

Gulf Coast: The survey was not administered in this section of BSC 497.

Spring 2012:

Hattiesburg: 100% (n = 13) of students seeking the B.S. in Biological Sciences indicated 4 or above that they are satisfied with their qualifications for professional employment or for post-graduate positions.

Gulf Coast: The survey was not administered in this section of BSC 497.

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

Implement Online Survey

Established in Cycle: 2011-2012

To increase the number of BSC 497 students completing the exit survey, an online delivery method will be implemented. This will ...

SLO 5: Technical skills consistent with major

Students will demonstrate technical skills consistent with their major.

Related Measures:

M 9: Entry-Level Assessment (Technical Skill)

Entry-level assessment: Students enrolled in BSC 110L (Principles of Biological Sciences I Lab) and BSC 111L (Principles of Biological Sciences II Lab) are assessed on their ability to properly use a microscope.

Source of Evidence: Academic direct measure of learning - other

Target:

70% of students will receive an overall score of satisfactory, as judged subjectively by the Teaching Assistant. The cohort is separated into students seeking the B.S. in Biological Sciences, the B.S. in Biological Sciences (Licensure), or the B.S. in Marine Biology.

Findings (2011-2012) - Target: Partially Met

Fall 2011:

Hattiesburg: In the BSC 110L course, 76.9% (n = 147) of students seeking a B.S. in Biological Sciences were judged to be satisfactory at properly using a microscope by the teaching assistants. In the BSC 111L course, 84.1% (n = 44) of students seeking a B.S. in Biological Sciences were judged to be satisfactory at properly using a microscope by the teaching assistants.

Gulf Coast: In the BSC 110L course, 92.3% (n = 13) of students were judged to be satisfactory at properly using a microscope by the instructor. Data was not sorted by degree plan. BSC 111 is not offered on this campus in the Fall semester.

Spring 2012:

Hattiesburg: In the BSC 110L course, 60% (n = 35) of students seeking a B.S. in Biological Sciences were judged to be satisfactory at properly using a microscope by the teaching assistants. In the BSC 111L course, 62.7% (n = 83) of students seeking a B.S. in Biological Sciences were judged to be satisfactory at properly using a microscope by the teaching assistants.

Gulf Coast: In the BSC 111L course, 100% (n = 38) of students were judged to be satisfactory at properly using a microscope by the instructor. Data was not sorted by degree plan. BSC 110 is not offered on this campus in the Spring semester.

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

Technical Skills Rubric

Established in Cycle: 2011-2012

Currently the assessment for introductory students' technical skills is evaluated subjectively by teaching assistants. The imp...

M 10: Upper Division Assessment (Technical Skills)

Upper Division Coursework Assessment: Students enrolled in BSC 380L (Microbiology Lab) complete two formal laboratory reports that require students to use different sets of technical skills. The first report involves bacterial plate counts; students perform serial dilutions, inoculate pour plates, and then count and assess colonies. The second report involves identification of unknown bacterial cultures; students subculture their sample and then perform routine staining and biochemical testing.

Source of Evidence: Written assignment(s), usually scored by a rubric

Target:

70% of students receive an overall score of average (70%) or better on each lab report. The grade is assigned using a rubric that assesses content, format, and style. The cohort is separated into students seeking the B.S. in Biological Sciences, the B.S. in Biological Sciences (Licensure), or the B.S. in Marine Biology.

Findings (2011-2012) - Target: Met

Fall 2011:

Hattiesburg: In BSC 380L, 94% (n = 32) of students seeking a B.S. in Biological Sciences scored 70% or greater on the first formal laboratory report as determined using a rubric designed to assess content, format, and style. For the second lab report, 97% (n = 32) of students seeking a B.S. in Biological Sciences scored 70% or greater as determined using a rubric designed to assess content, format, and style.

Gulf Coast: In BSC 380L, 93% (n = 14) of students seeking a B.S. in Biological Sciences scored 70% or greater on the two formal laboratory reports as determined using a rubric designed to assess content, format, and style.

Spring 2012:

Hattiesburg: In BSC 380L, 81% (n = 42) of students seeking a B.S. in Biological Sciences scored 70% or greater on the first formal laboratory report as determined using a rubric designed to assess content, format, and style. For the second lab report, 76% (n = 42) of students seeking a B.S. in Biological Sciences scored 70% or greater as determined using a rubric designed to assess content, format, and style.

Gulf Coast: BSC 380 is not offered on the Gulf Coast in the Spring.

M 12: Capstone Course Survey (Student Self-Assessment)

Students enrolled in BSC 497 (Senior Practicum) complete an informal instrument that allows self-assessment of content knowledge, understanding of the scientific process, development of technical skills and skills in written and oral communication, and satisfaction with their qualifications for employment or post-graduate positions.

Source of Evidence: Student satisfaction survey at end of the program

Target:

Using a 5 point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree): 75% of students indicate 4 or above that they developed technical skills consistent with their major.

Findings (2011-2012) - Target: Partially Met

Fall 2011:

Hattiesburg: 68.4% (n = 19) of students seeking the B.S. in Biological Sciences indicated 4 or above that they developed technical skills consistent with their major.

Gulf Coast: The survey was not administered in this section of BSC 497.

Spring 2012:

Hattiesburg: 84.6% (n = 13) of students seeking the B.S. in Biological Sciences indicated 4 or above that they developed technical skills consistent with their major.

Gulf Coast: The survey was not administered in this section of BSC 497.

Related Action Plans (by Established cycle, then alpha):

For full information, see the *Details of Action Plans* section of this report.

Implement Online Survey

Established in Cycle: 2011-2012

To increase the number of BSC 497 students completing the exit survey, an online delivery method will be implemented. This will ...

Details of Action Plans for This Cycle (by Established cycle, then alpha)**Counsel students on writing**

In these introductory courses, students' writing ability may not be well developed. Introducing students who are not performing up to standard to the Writing Center may be a useful tool.

Established in Cycle: 2011-2012

Implementation Status: Planned

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: Entry-Level Assessment (Laboratory Report) | **Outcome/Objective:** Understanding of the scientific process

Responsible Person/Group: BSC Assessment Committee, BSC 110/111 Lab Coordinator

Implement Online Survey

To increase the number of BSC 497 students completing the exit survey, an online delivery method will be implemented. This will ensure that all sections of the BSC 497 are administered the survey each semester and that useful data is obtained.

Established in Cycle: 2011-2012

Implementation Status: In-Progress

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: Employment/Professional School/Graduate Education | **Outcome/Objective:** Employment and professional/graduate education

Responsible Person/Group: BSC Assessment Committee, BSC 497 Faculty

Implement Online Survey

To increase the number of BSC 497 students completing the exit survey, an online delivery method will be implemented. This will ensure that all sections of the BSC 497 are administered the survey

Established in Cycle: 2011-2012

Implementation Status: In-Progress

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: Capstone Course Survey (Student Self-Assessment) | **Outcome/Objective:** Broad-based knowledge of Biology | Employment and professional/graduate education | Skill in scientific written and oral communication | Technical skills consistent with major | Understanding of the scientific process

Responsible Person/Group: BSC Assessment Committee, BSC 497 Faculty

Increase Student Preparation for Exam

Over the past few years, we have seen a small increase in student performance on this standardized exam. The BSC Assessment Committee will discuss methods to increase student preparation and person investment in their performance on the exam.

Established in Cycle: 2011-2012

Implementation Status: Planned

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: ETS Major Field Test in Biology | **Outcome/Objective:** Broad-based knowledge of Biology

Responsible Person/Group: BSC Assessment Committee, BSC 497 Faculty

Reconsideration of Upper Level Assessment criteria

Currently, this measure is based on the performance of students in a specific course (Genetics or Microbiology). The BSC Assessment committee will discuss whether or not to identify specific questions on exams to evaluate for "basic understanding of Biology concepts".

Established in Cycle: 2011-2012

Implementation Status: Planned

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: Upper Division Assessment (Exam Questions) | **Outcome/Objective:** Broad-based knowledge of Biology

Responsible Person/Group: BSC Assessment Committee, BSC 370 and 380 Faculty

Technical Skills Rubric

Currently the assessment for introductory students' technical skills is evaluated subjectively by teaching assistants. The implementation of a grading rubric would correct for differences among various individuals with varying degrees of teaching experience.

Established in Cycle: 2011-2012

Implementation Status: Planned

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: Entry-Level Assessment (Technical Skill) | **Outcome/Objective:** Technical skills consistent with major

Responsible Person/Group: BSC Assessment Committee, BSC 110/111 Lab Coordinator

Analysis Questions and Analysis Answers

What specifically did your assessments show regarding proven strengths or progress you made on outcomes/objectives?

After establishing the BSC Assessment Committee last year, we were able to identify specific measures that were inappropriate for the degree assessment. For example, in previous years, course grades were used to assess student learning outcomes. After review of the existing degree assessment plan, the committee was able to establish acceptable measures, identify appropriate methods to measure the student learning outcomes (i.e., rubrics), and identify where appropriate measures are lacking. We intend to establish appropriate rubrics for measuring student learning outcomes in technical skills assessment in the next year.

In addition, we identify areas in which collection of data was difficult. Specifically, the collection of indirect measures of all 5 student learning outcomes were weakly measure due to the lack of consistent use of exit surveys in the various BSC 497 Senior Capstone courses. The BSC Assessment Committee has developed an online survey that will be administered to all students in all sections of the BSC 497 course each semester. This will allow for proper reporting of data and a more complete picture of the information we are attempting to collect.

It is apparent that our students are improving in their written and oral communication skills over the course of their degree plan. We see that students struggle with written lab assignments in the introductory courses, but perform well on similar assignments in upper level courses (BSC 380) and written assignments in the BSC 497 course. We hope to improve writing skills even more by increasing entry level students' awareness of the Writing Center.

What specifically did your assessments show regarding any outcomes/objectives that will require continued attention?

It is apparent that the performance of our BSC students on the ETS Major Field Exam in Biology is not at the level we would like. On average, our students have consistently scored lower than the 50th percentile on the various sections of this exam. For those faculty that have taught the BSC 497 course, there is a feeling that students are not concerned with their performance on this exam and may not be preparing for the exam and completing the exam with the same attention that is given to other course work. The BSC Assessment Committee will address this issue in the next year to develop ways to improve student investment in the exam and hopefully student performance.

Another student learning outcome of interest is the development of technical skills consistent with the major. Though the entry level goal was not met this year, students are demonstrating acceptable technical skills in the upper level assessment (BSC 380 Microbiology). However, when students in the BSC 497 are surveyed, there seems to be a feeling that students are not gaining the technical skills consistent with their major. There seems to be a disconnect in what is evaluated by the faculty in coursework and what the students perceive. It may be useful to include an exercise in the BSC 497 course that focuses on what are technical skills consistent with the major and how are these appropriate for employment. Highlighting these factors may improve student perception of what they gained technically through the degree program.

Annual Report Section Responses

Program Summary

The Department of Biological Sciences (BSC) is the largest academic unit in the College of Science and Technology with 30 faculty and nearly 900 undergraduate students and 70 graduate students (approximately 1/2 MS and 1/2 PhD). BSC produces approximately 25% of the total student credit hours in the entire College. The Department is a research-intensive unit in which our faculty explore areas from biomedical/molecular biology to field biology and marine biology. This year the BSC faculty secured approximately \$6 million in

extramural funds in support of their research. This funding was largely from federal sources (National Institutes of Health, National Science Foundation, Department of Defense, Department of Energy, Department of Agriculture as well as from state sources and some private foundations). Typically faculty in BSC submit about 50 research proposals each year and have a very good record of success (approx. 25% funding rate). Undergraduate research is likewise a vital part of our efforts to train the next generation of scientists, researchers, clinicians, policy makers, etc., of the future. Generally each faculty member mentors 2-4 undergraduate (and sometimes high school students) in their laboratories. Additionally, BSC is the lead on the state-wide MS-INBRE (Mississippi IDeA Networks of Biomedical Research Excellence) project funded by the National Institutes of Health. In this work, we reach out to students across the entire state of Mississippi to provide hands-on research training via an intensive 12-week undergraduate summer research internship.

Continuous Improvement Initiatives

During AY 2011 - 2012, the newly formed BSC Assessment Committee worked to update the current degree assessment plans and ensure that all measures were appropriate for assessing the designated student learning outcomes. After several years of incomplete and inaccurate reports, we feel that our department has shown a direct effort to improve the development of our degree assessment plans and reports. We reviewed the existing student learning outcomes, ensuring that 5 different outcomes were selected. We also reviewed the long list of measures. First, we decided to remove several measures that were not appropriate (use of course grades as measures) or not necessary (multiple direct measure of the same student learning outcome). Though it is not necessary, we elected to maintain some of the measures at the Entry-Level, Upper-Level, and Capstone to evaluate any improvements seen as students move through the program. It is apparent that improvement is seen from the Entry-Level to Upper-Level and Capstone in written and oral communications.

Weaknesses in the assessment program have also been identified, particularly the lack of data collection on many of the indirect measures. Surveys were the common tool for these indirect measures. Due to multiple sections of the same course and lack of coordination among these sections, some students were not given the opportunity to complete the surveys and therefore our data collection is not complete. In the future, our assessment programs will be presented to the entire faculty and BSC Assessment Committee members will be given the responsibility of coordinating administration of surveys for all sections of the same course.

As stated earlier, the most important improvement to the BSC Degree Assessment process was identifying a group of faculty members to be responsible for understanding the process, instituting the measurements, collecting the data, and filing the reports. There has been an obvious improvement of these processes over the past year and we have identified several areas that still need improvement.

Closing the Loop

With the close of this academic year and the assembly of the AY 2011 - 2012 Degree Assessment Report, it is obvious that BSC has made major improvements in the area of assessment. Just a few years ago, our Degree Assessment Reports were not complete and often contained errors in reporting style. Several of the student learning outcomes measurements were inappropriate and others were never carried out. In the past year, a clear plan of action has been determined. Acceptable measures (at least one direct and one indirect) have been put into place. Importantly, these measures are doable. One of the issues of previous measures was the difficulty in actually carrying out the process (i.e., identifying appropriate tools for measuring content knowledge in an introductory course that services many different majors other than BSC). By eliminating these more difficult measures and relying on what works, we have been able to improve the overall process.

The current assessment plan still needs improvement, particularly the development of appropriate measures of technical skills at the Entry-Level and content knowledge measures at the Upper Level and Capstone. The BSC Assessment Committee are aware of these issues and will address these in the beginning of the upcoming cycle.