Unit Missions

BPS Mission Statement

Mission statement

The Department of Biological Sciences serves as the academic unit at Delta State University that is staffed and funded for the purposes of teaching and advising, conducting scholarly activities, and providing public/professional service work in the natural sciences. The mission of the Department of Biological Sciences is to provide high-quality instruction in the biological sciences, to encourage students to perform to their full potential, and to instill a scientific attitude that will develop scientifically literate, educated professionals. The Department seeks to develop the technical competence and the broad intellectual foundation needed to understand the impact of science and technology on humans and to make informed decisions on social, ethical, and environmental questions. The Department also endeavors to meet the general educational needs of the University; to contribute new knowledge in science and science education; and to serve the needs of educators, other professionals, and communities within the service area. Courses are offered that introduce the general student to the various fields of the biological sciences and that offer subject matter concentrations for students preparing for careers in science. The Department also serves students preparing to teach science at the elementary and secondary levels and students preparing for admission to professional schools in the health related fields.

Learning Outcomes

BS-BIO 01: Communication Skills

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology

Learning Outcome

Develop written communication skills appropriate for the sciences

Data Collection (Evidence)

Background: Students working on the BS in Biology degree at DSU are required to take three 300-level core courses covering the fundamental topics of cell biology, ecology, and genetics. As part of the final grade, each of these courses requires students to submit written assignments that assess substantive understanding of biological concepts and that are presented in a logical style.

1. From BIO 300 - Cell Biology
   Students enrolled in this course are required to complete a technical paper on an instructor-approved topic in cell biology, following a format used by many biological journals. 75 percent of students will receive a C grade or better on the paper.
2. From BIO 301 - Ecology
   Students enrolled in this course must submit a research paper on an instructor-approved topic in ecology, following the formatting guidelines used by most ecology journals. 75 percent of students will receive a C grade or better on the paper.
3. From BIO 328 - Genetics
   Students enrolled in this course are required to submit specific format laboratory reports written using data collected during the course, and analysis of data, about the outcomes of Drosophila crosses. 75 percent of students will receive a C grade or better grade averaged over all lab reports.

Results of Evaluation

1. From BIO 300 - Cell Biology

For fall 2014, 21 of 24 students (96%) received satisfactory scores on the term paper (performed at C or better level). For spring 2015, 27 of 28 (96%) received satisfactory score (attained C or better level) Summer I 2015 scores have not been reported to Chair yet.

2. From BIO 301 - Ecology

For the AY 2014-2015, 94% of the research papers submitted in BIO 301 Ecology received a grade of "C" or higher. The goal of 75% of the students earning a "C" or better on the research reports was achieved for the AY 2014-2015. For Fall 2014, the average score on research reports was 82.67%, and 22 of 24 students (91.67%) performed at "C" or better. For Spring 2015, the average score on research reports was 89.95% and 25 of 26 (96.15%) students performed at "C" or better.

3. From BIO 328 - Genetics

For Fall 2014-15, the average score on lab reports was 89%, and 25 of 27 students (93%) mastered all assigned activities (performed at C or better level). For Spring 2014, the average score on lab reports was 86%, and 29 of 31 students (94%) mastered all assigned activities (performed at C or better level).

Use of Evaluation Results

1. From BIO 300 - Cell Biology

For fall, 2014 the only student who got a failing grade on the paper did not submit any paper. For spring 2015 one student did not stay on the topic. The paper submitted was irrelevant to the topic chosen. In future students will be reminded of the importance of submitting the term paper on time and the importance of staying on the topic. In future, the paper topics will be included in the syllabus, and students will be required to confirm choices of their topics in good time. Students will be required to follow a timeline in working on their papers and, submit drafts for review and guidance. Students will be required to select and confirm their topics during the first month of the semester so as the have ample time to work with the teacher in order for them to improve the breadth and depth of the term papers.

2. From BIO 301 - Ecology

The one student who did not reach the "C" grade in Spring 2015 and the two during Fall 2014 failed to turn in reports. The increase in scores is the result of creating "checkpoints" throughout the semester where the students turned in a portion of their report (i.e. Title, Bibliography, Copies of articles used, and a Draft). The component at each "checkpoint" was edited and returned to the student. The end result was a sharp increase in the overall grades for the final reports.

3. From BIO 328 – Genetics

Lab report scores exceeded the goal, however, some students who did not perform at the C level simply did not complete all work. In future semesters, report deadlines will be modified, and additional reminders will be given that the reports are coming due so that students might get them finished in time and not run out of time to prepare them properly. Lab report directions will be modified to make it clearer to students exactly what a successfully written report should look like.

The data indicate some ability to communicate scientific information. Students would additionally benefit from oral communication experience in the form of scientific presentations. Robust and vigorous curriculum committee meetings are being held to plan for possible changes. A subcommittee has been formed to explore the feasibility of adding a capstone seminar course to the degree requirements.

BS-BIO 02: The Scientific Method

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology
Learning Outcome
Demonstrate proficiency with the scientific method through answering questions using the scientific method

Data Collection (Evidence)
Background: Students working on the BS in Biology degree at DSU are required to take three 300-level core courses covering the fundamental topics of cell biology, ecology, and genetics. As part of the final grade, each of these courses requires students to submit laboratory reports in which they document laboratory exercises requiring the steps of the scientific method: generating hypotheses, performing experiments, analyzing data, and deriving conclusions.

1. From BIO 300 - Cell Biology
   Students enrolled in this course are required to complete laboratory reports documenting use of the scientific method related to cell-related experiments. 75 percent of students will receive a C grade or better grade averaged over all lab reports.
2. From BIO 301 - Ecology
   Students enrolled in this course must submit weekly lab reports that identify the components of the scientific method as related to ecological exercises. 75 percent of students will receive a C grade or better grade averaged over all lab reports.
3. From BIO 328 - Genetics
   Students enrolled in this course are required to submit specific format laboratory reports written using data collected during the course, and analysis of data, about the outcomes of Drosophila crosses. 75 percent of students will receive a C grade or better grade averaged over all lab reports.

Results of Evaluation
1. From BIO 300 - Cell Biology
For fall 2014, 21 of 24 students (88%) obtained an average score of C or better on lab reports. For spring 2014, 26 of 28 students (93%) obtained an average score of C or better on lab reports. For Summer I, 2015 no scores have been reported to the Chair yet.

2. From BIO 301 - Ecology
For the AY 2014-2015, 90% of the students earned an average score of “C” or better on laboratory reports. The goal of 75% of the students earning a “C” or better on lab reports was achieved for the AY 2014-2015. 21 of 24 students (87.5%) enrolled in the course in Fall 2014, and 24 of 26 (92.31%) in Spring 2015, received an average grade of "C" or higher on the lab reports.

3. From BIO 328 - Genetics
For Fall 2014, the average score on lab reports was 89%, and 25 of 27 students (93%) mastered all assigned activities (performed at C or better level). For Spring 2014, the average score on lab reports was 86%, and 29 of 31 students (94%) mastered all assigned activities (performed at C or better level).

Use of Evaluation Results
1. From BIO 300 - Cell Biology
The few students who failed to attain a C did not read the lab instructions in advance, as required. Often this led to inability to complete the lab exercises on time. The other reason was failure to respond to lab questions or analyze data as required. The importance of reading lab instructions before the labs, data collection, data analysis and response to post-lab questions will be reemphasized.

2. From BIO 301 - Ecology
Some students who did not perform at the C level on lab reports failed to submit all the reports or turned in incomplete reports. Additional reminders will be given that the reports are coming due so that students might get them finished in time and not run out of time to prepare them properly. Additional suggestions will be given in the lab report directions to clarify for students exactly what a successfully written report should look like.

3. From BIO 328 - Genetics
Lab report scores exceeded the goal, however, some students who did not perform at the C level simply did not complete all work. In future semesters, report deadlines will be modified, and additional reminders will be given that the reports are coming due so that students might get them finished in time and not run out of time to prepare them properly. Lab report directions will be modified to make it clearer to students exactly what a successfully written report should look like.

4. The curriculum committee has discussed using a common rubric to evaluate scientific research. Such a rubric made be implemented in courses where appropriate in the future to assess investigation skills.

5. Also under consideration is the creation of an additional outcome that would relate to developing skills in the use of technology.

BS-BIO 03: Fundamental Concepts

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology
Learning Outcome
Demonstrate knowledge of fundamental concepts in biology in broad categories such as cellular biology, genetics, and ecology

Data Collection (Evidence)
Background: Students working on the BS in Biology degree at DSU are required to take three 300-level core courses covering the fundamental topics of cell biology, ecology, and genetics. Because these core courses expand on basic biological concepts which students first experience in introductory biology and are required for all biology majors, success in these courses is used as the assessment of content considered necessary for all biology majors.

1. From BIO 300 - Cell Biology
Students enrolled in this course are required to learn the details of principles relating to the structure and function of cells. 75 percent of students will receive a grade of C or better on the final exam, which comprehensively tests content covered in the course.

2. From BIO 301 - Ecology
Students enrolled in this course are required to learn the details of ecological principles, developing an understanding of the interactions between organisms and their environment. 75 percent of students will receive a grade of 65% or better on the final exam, which comprehensively tests content covered in the course.

3. From BIO 328 - Genetics
Students enrolled in this course are required to learn the details of genetics including classical

(Mendelian) genetics, molecular genetics, and population genetics. 75 percent of students will receive a grade of 65% or better on the final exam, which comprehensively tests content covered in the course.

Results of Evaluation

1. From BIO 300 - Cell Biology

For Fall 2014, 18 of 24 students (75%) obtained a score of C or better on the final exam. For Spring 2015, 25 of 28 students (89%) obtained a score of C or better on the final exam. For Summer I 2015 no scores have been reported to Chair yet.

2. From BIO 301 - Ecology

For Fall 2014, the average score on the final exam was 76%, and 19 of 24 students (79.17%) obtained a score of 70% or above. For Spring 2015, the average score on the final exam was 82.64%, and 23 of 26 students (88.46%) obtained a score of 70% or above. The goal of 75% of the students earning a "C" or better on the final exam was achieved for the Fall 2014 and Spring 2015 semesters.

3. From BIO 328 - Genetics

For Fall 2014, the average score on the final exam was 62%, and 11 of 27 students (41%) obtained a score of 65% or above. For Spring 2014, the average score on the final exam was 54%, and 8 of 35 students (23%) obtained a score of 65% or above.

Use of Evaluation Results

1. From BIO 300 - Cell Biology

Some students don't score a C or better because they did not prepare adequately for the final examination. Some did not use the chapter review questions that are always included at the end of every power-point lesson. Some were not able manage their time well during, the final examination and were not able to finish on time. In future semesters students will be impressed upon the importance of using the review questions and proper time management when taking examinations. They will also be requested to constantly, refer to the guidelines on how to succeed in cell biology, has been added on CANVAS as part of the course.

2. From BIO 301 - Ecology

Ecology includes many concepts that draw on a student's critical thinking and problem solving skills. Many of the test items on ecology exams require these skills. Two of the students who did not achieve the desired outcome did not complete the final examination and some left many of the questions blank; an indication of not applying themselves to the task at hand. The course content, delivery methods, level of rigor, and exam difficulty are being evaluated to identify changes that can be made in the course to improve student performance at the end of the semester as indicated by the final exam score. In subsequent semesters, more class time will be devoted to working assigned homework problems, and tutorial sessions will be held for students who need additional help developing these skills. Also, performance on specific categories of test items will be examined to note which concepts students are finding the most difficult. Special attention will be paid to these concepts in future offerings of the course.

3. From BIO 328 - Genetics

The course content, delivery methods, level of rigor, and exam difficulty are being evaluated to identify changes that can be made in the course to improve student performance at the end of the semester as indicated by the final exam score. Genetics includes many concepts that draw on a student's critical thinking and problem solving skills. Many of the test items on genetics exams require these skills. In subsequent semesters, more class time will be devoted to working assigned homework problems, and tutorial sessions will be held for students who need additional help developing these skills. Also,

performance on specific categories of test items will be examined to note which concepts students are finding the most difficult. Special attention will be paid to these concepts in future offerings of the course.
Although the final exam scores do not currently come close to meeting the goal, it should be noted that that exam is just one component of many which contribute to a student's overall course grade. The percentage of students with overall course grades at or above 65% is significantly higher than that on the final exam alone.

The curriculum committee is investigating the use of a standardized exit exam to be taken by graduating students to further assess their overall knowledge of biological principles. Both nationally-normed exams and locally-created instruments are being considered.

BS-BIO 04: Data Assessment

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology
Learning Outcome
Demonstrate the skill to assess and analyze data with objectivity

Data Collection (Evidence)
Background: Students working on the BS in Biology degree at DSU are required to take three 300-level core courses covering the fundamental topics of cell biology, ecology, and genetics. Because these core courses expand on basic biological concepts which students first experience in introductory biology and are required for all biology majors, success in these courses is used as the assessment of content considered necessary for all biology majors.

1. From BIO 300 - Cell Biology

Students enrolled in this course are required to complete laboratory reports which include describing how data was collected and how conclusions were drawn from analysis of the data. 75 percent of students will receive a C grade or better grade averaged over all lab reports.

2. From BIO 301 - Ecology

Students enrolled in this course are required to complete laboratory reports which include describing how data was collected and forming conclusions from analysis of the data. 75 percent of students will receive a C grade or better grade averaged over all lab reports.

3. From BIO 328 - Genetics

Students enrolled in this course are required to complete laboratory reports which include describing how data was collected and how conclusions were drawn from analysis of the data. 75 percent of students will receive a C grade or better grade averaged over all lab reports.

Results of Evaluation

1. From BIO 300 - Cell Biology
For fall 2014 18 of 24 students (75%) obtained a score of C or better on the final exam. For spring 2015, 25 of 28 students (89% obtained a score of C or better on the final exam For Summer I, 2015 no scores reported yet.

3. From BIO 328 - Genetics
For Fall 2014, the average score on lab reports was 89%, and 25 of 27 students (93%) mastered all assigned activities (performed at C or better level). For Spring 2014, the average score on lab reports was 86%, and 29 of 31 students (94%) mastered all assigned activities (performed at C or better level).

Use of Evaluation Results
1. From BIO 300 - Cell Biology
Some students who failed to attain a C did not read the lab instruction in advance. Often this led to inability to complete the lab exercise on time. Some student failed to show up during labs that did not have a make-up option due to the types of materials used. Some students did not record or analyze the data as instructed. Some students did not respond to post-lab questions. In future, students will be required to demonstrate in some way that they read the lab instructions before the start of the labs. Students who are unable to attend their assigned labs will be advised to attend the alternate lab. Students will also be advised to revise their data analysis and graphing skills prior to labs that generate data that needs such analysis like tabulation and graphing data.

3. FROM BIO 328 - Genetics
Lab report scores exceeded the goal, however, some students who did not perform at the C level simply did not complete all work. In future semesters, report deadlines will be modified, and additional reminders will be given that the reports are coming due so that students might get them finished in time and not run out of time to prepare them properly. Lab report directions will be modified to make it clearer to students exactly what a successfully written report should look like. Also under consideration for the next academic year is modifying this outcome or creating an additional outcome that would relate to developing skills in the use of technology.

BS-ENV 01: Written Communication Skills
Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology
Learning Outcome
Students will demonstrate technical writing ability that will permit communication with the scientific community about environmental science.

Data Collection (Evidence)
Background: All students working on the BS in Environmental Science degree at DSU are required to take two core courses covering fundamental topics related to the field of environmental science. As part of the final grade, each of these courses requires students to submit written assignments that assess substantive understanding of environmental science concepts and that are presented in a logical style. The Biology course is currently used to measure the achievement of the outcome.

From BIO 301 - Ecology
Students enrolled in this course must submit a research paper on an instructor-approved topic in ecology, following the formatting guidelines used by most ecology journals. The outcome is achieved if 75% of the students receive a grade of C or better on the research paper.

Results of Evaluation

From Bio 301 - Ecology

For the AY 2014-2015, 94% of the research papers submitted in BIO 301 Ecology received a grade of "C" or higher. The goal of 75% of the students earning a "C" or better on the research reports was achieved for the AY 2014-2015. For Fall 2014, the average score on research reports was 82.67%, and 22 of 24 students (91.67%) performed at "C" or better. For Spring 2015, the average score on research reports was 89.95% and 25 of 26 (96.15%) students performed at "C" or better.

Use of Evaluation Results

From BIO 301 - Ecology

The one student who did not reach the "C" grade in Spring 2015 and the two during Fall 2014 failed to turn in reports. The increase in scores is the result of creating "checkpoints" throughout the semester where the students turned in a portion of their report (i.e. Title, Bibliography, Copies of articles used, and a Draft). The component at each "checkpoint" was edited and returned to the student. The end result was a sharp increase in the overall grades for the final reports.

BS-ENV 02: The Scientific Method

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology

Learning Outcome

Students will conduct biological investigations using the scientific method.

Data Collection (Evidence)

Background: All students working on the BS in Environmental Science degree at DSU are required to take ecology, covering fundamental topics related to the field of environmental science and generating hypotheses, performing experiments, analyzing data, and deriving conclusions.

From BIO 301 - Ecology

Students enrolled in this course must submit weekly lab reports that identify the components of the scientific method as related to ecological exercises. 75 percent of students will receive a C grade or better grade averaged over all lab reports.

Results of Evaluation

From BIO 301 - Ecology

For the AY 2014-2015, 90% of the students earned an average score of "C" or better on laboratory reports. The goal of 75% of the students earning a "C" or better on lab reports was achieved for the AY 2014-2015. 21 of 24 students (87.5%) enrolled in the course in Fall 2014, and 24 of 26 (92.31%) in Spring 2015, received an average grade of "C" or higher on the lab reports.

Use of Evaluation Results

From BIO 301 - Ecology

Some students who did not perform at the C level on lab reports failed to submit all the reports or turned in incomplete reports. Additional reminders will be given that the reports are coming due so that students might get them finished in time and not run out of time to prepare them properly. Additional suggestions will be given in the lab report directions to clarify for students exactly what a successfully written report should look like.

BS-ENV 03: Fundamental Concepts

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology
Learning Outcome
Students will demonstrate knowledge of fundamental concepts in environmental science in broad categories such as ecology and geospatial analysis.

Data Collection (Evidence)
Background: All students working on the BS in Environmental Science degree at DSU are required to take ecology, covering fundamental topics related to the field of environmental science. Because this core course expands on basic concepts which students first experience in introductory biology and are required for all environmental science majors, success in these courses is used as the assessment of content considered necessary for all environmental science majors.

From BIO 301 - Ecology
Students enrolled in this course are required to learn the details of ecological principles, developing an understanding of the interactions between organisms and their environment. 75 percent of students will receive a grade of 70% or better on the final exam, which comprehensively tests content covered in the course.

Results of Evaluation
From BIO 301 - Ecology
For Fall 2014, the average score on the final exam was 76%, and 19 of 24 students (79.17%) obtained a score of 70% or above. For Spring 2015, the average score on the final exam was 82.64%, and 23 of 26 students (88.46%) obtained a score of 70% or above. The goal of 75% of the students earning a “C” or better on the final exam was achieved for the Fall 2014 and Spring 2015 semesters.

Use of Evaluation Results
From BIO 301 - Ecology
Ecology includes many concepts that draw on a student's critical thinking and problem solving skills. Many of the test items on ecology exams require these skills. Two of the students who did not achieve the desired outcome did not complete the final examination and some left many of the questions blank; an indication of not applying themselves to the task at hand. The course content, delivery methods, level of rigor, and exam difficulty are being evaluated to identify changes that can be made in the course to improve student performance at the end of the semester as indicated by the final exam score. In subsequent semesters, more class time will be devoted to working assigned homework problems, and tutorial sessions will be held for students who need additional help developing these skills. Also, performance on specific categories of test items will be examined to note which concepts students are finding the most difficult. Special attention will be paid to these concepts in future offerings of the course.

BS-ENV 04: Data Analysis

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology
Learning Outcome

Students will demonstrate the skill to assess and analyze data with objectivity.

Data Collection (Evidence)
Background: All students working on the BS in Environmental Science degree at DSU are required to take ecology, covering fundamental topics related to the field of environmental science. This course requires students to perform experiments, collect data, analyze those data, and draw conclusions based on their analysis.

From BIO 301 - Ecology
Students enrolled in this course are required to complete laboratory reports which include describing how data was collected and forming conclusions from analysis of the data. 75 percent of students will receive a C grade or better grade averaged over all lab reports.

Results of Evaluation
From BIO 301-Ecology
For Fall 2014, the average score on lab reports was 74.00%, and 20 of 24 students (83.00%) performed at C or better. For Spring 2015, the average score on lab reports was 75.17%, and 24 of 26 students (92.31%) performed at C or better.

Use of Evaluation Results
From BIO 301-Ecology
Lab report scores for the Fall 2014and spring 2015 semesters met the goal of 75% receiving a C or higher. Some students who did not perform at the C level on lab reports failed to submit all the reports or turned in incomplete reports. Additional reminders will be given that the reports are coming due so that students might get them finished in time and not run out of time to prepare them properly. The increase in scores is due to spending more time explaining how to develop the lab reports and reminders of when the reports are due.

2. BIO 301 is one of only two science courses that are taken by all environmental science majors. The curriculum committee is considering evaluating additional courses that are common to each degree concentration so as to obtain a more complete assessment of the degree program. BIO 415 - Materials and Methods in Environmental Science would be appropriate for the General and GIS concentrations, while BIO 321 - Wildlife Techniques and/or BIO 463 - Wildlife Habitat Management would be appropriate for the Wildlife Management concentration.

MAS-GIT 01: GIT Application and Methodology

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology
Learning Outcome
Students will learn fundamental knowledge and applications of GIT, and needed skills related to communicate spatial information and methodological techniques.

Data Collection (Evidence)
1. From REM 616 - Remote Sensing
All MAS students are required to master the basic principles on which remote sensing is based, and how aerial and satellite remote sensing data (VIS, VNIR, SWIR, Thermal IR, RADAR, LiDAR) are acquired,

processed and eventually applied in various fields. All the students are required to receive a B grade or better for this class.

2. From REM 611 - Digital Image Processing
All MAS students are required to master the digital image basics from data format, storage, to image formation, theory and techniques of image interpretation, rectification, restoration, correction, enhancement and classification, applications of feature extraction and change detection for Earth resources management using airborne and satellite images.

Results of Evaluation
1. From REM 616 - Remote Sensing
83% of the students in REM616-Remote Sensing received A, and 27% of the students received B for the AY 2014-15. The average score of the cohort was above B.

2. From GIS610 - Advanced Geographic Information Systems and Sciences
27% of the students in GIS610 - Advanced Geographic Information Systems and Sciences received A, 9% of the students received B, 27% did not complete the class with "I" recorded , and 18% students failed the class for the AY 2014-15. The average score of the cohort was below B.

Use of Evaluation Results
1. From REM 616 - Remote Sensing
Most students had a good understanding of remote sensing theory and applications. A pretest of remote sensing basics was given prior to the class and one-to-one tutoring including tutoring on computer basics was given to some students who had less background. This kind of tutoring is proved to be helpful and beneficial to other classes offered in the program as well.

2. From GIS610 - Advanced Geographic Information Systems and Sciences
There were only 36% students received the passing grade that was required by MAS-GIT program degree requirement. The rest 64% of students failed or could not complete the class. The academic standing of those students is of concern. This class needs to be reviewed in terms of class materials, assignments, schedule etc. to find out the reasons that students could not do well in the class.

MAS-GIT 02: Geospatial Analysis

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology
Learning Outcome
Students will demonstrate foundational skills needed to perform complex geospatial analyses. They will develop a working knowledge of ArcGIS, ENVI, and other contemporary GIT-related tools used in developing and implementing geospatial strategies.

Data Collection (Evidence)
Background: MAS students are required to master GIT techniques and adequate hands-on experience to utilize GIT software and tools. The techniques of preparing datasets, creating maps, and performing spatial analysis should be readily transferable to their future work places.

All students enrolled in REM 611-Digital Image Processing are required to complete 6 computer labs, take a final exam and propose a course project to demonstrate their understanding of principles in image

analysis, competency of using ENVI and ArcGIS to analyze image data. They are required to figure out the methods of integrating these two software and other GIS-related tools (Google Earth, USGS Earth Explorer etc.) to produce image products with professional map legends for user reading and submit lab reports with their interpretation to images.

Results of Evaluation
50% of the students in REM 611- Digital Image Processing received A, 40% of the students received B, and 10% of the students received C. The average score was above B. The distribution of grades reflects the levels of learning outcome. 80% of the students received A for the research proposal.

Use of Evaluation Results
REM 611 - Digital Image Processing class uses the step-by-step instructions and screen-shots for students to finish labs. Face-to-face tutorials proved to be very helpful. One student who received C in this class had difficulties with time management (three classes and a job). She also had difficulty with proposal writing. The students who received B also needed extra help in proposal writing. In future teaching, more resources and help in writing will be provided for writing.

MAS-GIT 03: Proposal Development

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology
Learning Outcome
Students will demonstrate ability in developing research proposal and communicating project process in written, oral, and graphic media at a professional level.

Data Collection (Evidence)
Background: MAS students are required to submit lab reports for each computer labs assigned, write research proposals, communicate research ideas with the advisor prior to the formation of proposal and in the course of conducting research.

All students enrolled in REM 611-Digital Image Processing must complete lab reports for documenting the implementation of labs, analysis of results and related discussions. Students will receive B grade or above averaged over all lab reports. They are required to submit a 3-5 page research proposal to clearly demonstrate the design of project and methodology of carrying out research, provide a flowchart of research steps, and write progress reports to the instructor.

Results of Evaluation
50% of students in the REM 611-Digital Image Processing received A averaged over all lab reports. 87% students received A for the research proposal.

Use of Evaluation Results
Students who received B averaged over all lab reports had adequate lab work but did not give sufficient explanation to their results. The students liked to conduct computer labs yet tend to think that their screenshots of the lab can self-explain. In the proposal writing, the similar situations were found. The students could talk very well while could not express clearly in written format. Some guidance on scientific writing was provided to the students. Continuous observation is needed to see whether improvements in writing are noticeable in future.

MAS-GIT 04: Independent Research

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology
Learning Outcome
Students will demonstrate critical thinking and independent research ability. They will be able to propose original research topic, conduct literature review, plan, implement, and execute a comprehensive GIS project.

Data Collection (Evidence)
Background: All students in the MAS program must design, develop and complete a major individual project that solves a real-world problem by applying GIS, remote sensing and GPS knowledge and skills. The project involves experiments and analysis, database and systems design, software development, systems implementation and eventual deployment.

All students enrolled in GIS 690-Capstone Project must write a research proposal to describe their design of project, plan the timeline for conducting the project, and submit weekly progress reports. Upon the completion of project, students are required to submit a final project report.

Results of Evaluation
75% of students in the GIS 690-GIS Capstone has finished the project and submitted the first draft of report in the end July 2014 as required. 25% students are in progress of working on the project and writing.

Use of Evaluation Results
Students who have not finished the GIS690 project did not balance the work and study very well. Also the two month period for finishing a decent project and write up a 60-70 page project paper is tight. The program has made some adjustments in length as a remedy so that students have sufficient time to finish the project and classes.

MAS-GIT 05: Laboratory and Field Experiments

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology
Learning Outcome
Students will learn how to operate cutting-edge geospatial instruments to collect, process and visualize the data. Students will learn the data management skills from laboratory and field experiments, and computer simulation.

Data Collection (Evidence)
Background: MAS students are required to master the techniques in using GIT-related instruments for data acquisition and the subsequent data analysis. They are required to participate or watch the videos of their cohorts conducting field practice. All the students are required to process and analyze collected data.

1. From REM 616 - Remote Sensing
Students enrolled in REM 616-Remote Sensing were arranged to watch the videos of laboratory and field experiments recorded in the last year. They learned techniques of using a modern Garmin 550T Tracking GPS, a hyperspectral field spectrometer, a digital camera with GPS settings, an airborne hyperspectral mission. A computer lab was assigned for analyzing the collected data.

2. From GIS 631-Photogrammetry
Students enrolled in GIS 631-Photogrammetry were given the practice of simulating flight plan and 3-D flight line for data acquisition. They learned the factors to be considered for airborne remote sensing and photogrammetric data collection, and methods of measuring geographic elements from photogrammetric products.

Results of Evaluation
1. From REM 616 - Remote Sensing
Students demonstrated extremely strong interest in the real-world experiments and field remote sensing methods. Bonus grades were given to students who would like to have extra experiments at their place.
2. From GIS 631-Photogrammetry
This year a new photogrammetric technology Unmanned Aerial Vehicle was introduced to students. With some local students, the UAV operation and image collections were conducted. The whole process were recorded and shared with remote students. The data and analysis were also posted on the class website so all students could access.

Use of Evaluation Results
Real-world experiments and simulations are of great interest to students. Students are eager to learn advances of new GIT technology and the applications after they learned the fundamentals. Through the OIT Challenge Grant, several research projects have been planned and a geospatial database is being built. The database is a great resource for students in the program.

MSNS-01: Critical Thinking

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology
Learning Outcome
Students will demonstrate critical thinking in their critique of a scientific article from a peer reviewed journal.

Data Collection (Evidence)
Students will be monitored in an upper level course by a review of their critique of peer reviewed journal articles.

Results of Evaluation
Typically, students in the M.S.N.S Biology track enrolled in BIO 601 select articles from an area of interest to them and critique these articles. We did not have an instructor who was credentialed to teach this course in Fall 2014 so the course was not offered.

Use of Evaluation Results
Faculty are continuing discussions to determine an effective means of measuring common learning outcomes for a diverse student population. Because students take different courses in biology, it has been difficult to assess a common method to assess critical thinking.

MSNS-02: Written Communication Skills

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology

Learning Outcome
Students will demonstrate writing communication skills through technical writing.

Data Collection (Evidence)
Students will be monitored in an upper level course by assessing their ability to write a 10-15 page paper in the field.

Results of Evaluation
Typically, M.S.N.S students enrolled in BIO 601 complete a literature review paper to assess written communication skills. As the department did not have a faculty member credentialed to teach this graduate level course, BIO 601 was not offered in AY 2014-15.

Use of Evaluation Results
There are no common courses in all three M.S.N.S tracks. Faculty are continuing discussions on effective means of measuring common learning outcomes for a diverse student population.

MSNS-03: Independent Research

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology

Learning Outcome
Students will demonstrate the ability to conduct independent research.

Data Collection (Evidence)
Students will be assessed by a presentation on their research findings.

Results of Evaluation
This learning outcome pertains only to students in the M.S.N.S Chemistry track. There currently is no research track in the M.S.N.S with an emphasis in Biology.

Use of Evaluation Results
N/A for M.S.N.S. with an emphasis in Biology as there is no research track.

MSNS-04: Oral Communication

Start: 7/1/2014
End: 6/30/2015
Providing Department: Biology

Learning Outcome
Students will demonstrate proficiency in oral science communication.

Data Collection (Evidence)

Students will be assessed by sitting for oral master examinations upon completion of research and coursework.

Results of Evaluation

Two students in the Biology Education option both passed their oral masters examinations.

Use of Evaluation Results

Faculty are in discussions regarding the implementation of a common rubric that rates students as follows: Fail, Marginally Pass, Average, Above Average and Outstanding in several key categories. Students who Fail will be given instruction and opportunity to remediate the problem.

Gen Ed Learning Outcomes

BIO_100_GE01: Critical and Creative Thinking

Start: 7/1/2014
End: 6/30/2015

Gen Ed learning outcome (competency)
Developing sound analytical and reasoning skills and the ability to use them to think critically, solve problems, analyze logically and quantitatively, and effectively respond to change

Data Collection
Students enrolled in BIO 100 take a pre-test and post-test covering basic concepts of biology. Many of the item on this test assess critical thinking and problem solving. Goal: 75% of students will show an improvement of at least 5 percentage points from pre-test to post-test.

Results of Evaluation
For Fall 2014, the average pre-test score was 47%. The average post-test score was 55%. For Spring 2015, the average pre-test score was 45%. The average post-test score was 56%.

Use of Results
For fall semester, the improvement was 8%. For spring semester, the improvement was 11%. Improvement exceeded the goal. Further analysis of pre-post test results are will be done to identify specific content areas that students are finding most challenging. BIO 100 instructors will discuss changes that can be made to those content areas to help increase understanding of basic biological concepts.

BIO_100_GE03: Quantitative Skills

Start: 7/1/2014
End: 6/30/2015
Gen Ed learning outcome (competency)
Enhancing abilities for symbolic and numeric reasoning and the ability to use and understand statistical and other quantitative techniques to interpret data

Data Collection
Students enrolled in BIO 100 take the Test of Integrated Process Skills (TIPS) test as a pretest and post-test. The TIPS assesses understanding of the scientific method, including analysis of quantitative data, hypothesis testing, and interpretation of graphs. Goal: 75% of students will show an improvement of at least 5 percentage points from pre-test to post-test.

Results of Evaluation
For Fall 2014, the average pre-test score was 64%. The average post-test score was 70%. For Spring 2015, the average pre-test score was 61%. The average post-test score was 70%.

Use of Results
For fall semester, the improvement was 6%. For spring semester, the improvement was 9%. Improvement exceeded the goal. The laboratory portion of this course is primarily concerned the teaching science processes. Over the past few years, instructors of BIO 100 have redesigned the laboratory exercises. We

will continue discussion of the new lab exercises focusing on ways to give students more experience with data analysis to improve their quantitative skills.

BIO_100_GE04: Inquiry and Technology

Start: 7/1/2014
End: 6/30/2015
Gen Ed learning outcome (competency)
Building the skills for the search, discovery, evaluation, and application of information, including an understanding of the nature and limits of appropriate technologies

Data Collection
Students enrolled in BIO 100 take the Test of Integrated Process Skills (TIPS) test as a pretest and post-test. The TIPS assesses understanding of the scientific method, including understanding of technologies used in science and interpretation of experimental results. Goal: 75% of students will show an improvement of at least 5 percentage points from pre-test to post-test.

Results of Evaluation
For Fall 2014, the average pre-test score was 64%. The average post-test score was 70%. For Spring 2015, the average pre-test score was 61%. The average post-test score was 70%.

Use of Results
For fall semester, the improvement was 6%. For spring semester, the improvement was 9%. Improvement exceeded the goal. The laboratory portion of this course is primarily concerned the teaching science processes. Over the past few years, instructors of BIO 100 have redesigned the laboratory exercises. We will continue discussing the new lab exercises, exploring new ways to use more technology, such as incorporating data acquisition using the Vernier systems recently acquired through the Title III grant. This should help students to develop better science inquiry skills and increase their experience with the scientific process.

BIO_110_GE04: Inquiry and Technology

Start: 7/1/2014
End: 6/30/2015
Gen Ed learning outcome (competency)
Building the skills for the search, discovery, evaluation, and application of information, including an understanding of the nature and limits of appropriate technologies

Data Collection
Skills pertaining to scientific discovery, evaluation, and application are emphasized throughout the course, and several assignments require use of library databases and internet resources. 15% of the final grade is based on a writing assignment in which students select a topic such as a human ailment, endangered species, or urban sprawl. The instructor reviews and returns the rough draft so that students can make appropriate revisions. Goal: 80% of the students will show an improvement on their final report.

Results of Evaluation
For Fall 2014, 95.7% of the students received an 80% grade or better on their written project. 87.2% of the students that turned in a rough draft improved their scores. In Spring 2015, 96% of the students

received an 80% grade or better on their written project. Only one student (1/51 or 2% did not turn in a rough draft. Two students (2/51 or 3.9%) who turned in a rough draft still did not provide a good product, despite encouraging them to go to the writing center. Overall the rough draft helped students immensely with their course grade. Many suggestions are made as to how to organize thoughts, cite sources, and compile data. Students also learn how to work effectively in groups.

Use of Results

Students tend to do well on their written project. Considerable time is spent discussing what is expected with regards to the written project. For example, one laboratory is strictly devoted to learning how to use the library catalog and databases. Students also submit a title of their project within the first month of the semester which allows them more time to retrieve library materials and organize their thoughts. In addition, the rough draft is due by the 11th week of the semester. The instructor usually returns the rough draft within a week. As a result, students have adequate time to make necessary corrections. The goal of having more than 90% of the students acquire a grade of 80% or better on their written project was achieved during the 2014/2015 academic year.

BIO_110_GE05: Self

Start: 7/1/2014
End: 6/30/2015

Gen Ed learning outcome (competency)

Developing a fundamental understanding of the intricate nature of humans and the knowledge, interests, and skills to promote well-being and health

Data Collection

Lecture, laboratory, and outside classroom assignments are used that generate student awareness of environmental problems such as ecosystem awareness, global disease, species on the brink of extinction, human population growth, genetically engineered foods, how species evolve, and more. Seven out of thirteen laboratory assignments are used to evaluate this competency. (One lab period was not met each semester due to weather conditions (tornadoes and snow days)). They require students to discuss their opinions orally and write responses to short-answer questions. These assignments count for 50% of a student's laboratory grade. The goal is for 80% of the students to achieve an 80% or better on these lab assignments. This competency will not be evaluated in 2015/2016 since learning outcome competencies was reduced from 10 to 5.

Results of Evaluation

From Bio 110 - 64.5-91.67% of the students received a grade of 80% or better for the selected exercises. In Spring 2015, 70.5-92 % of the students received a grade of 80% or better on the same labs. Dr. Baghai-Riding's class size was larger for spring semester (51 students completed the course in Spring 2015 compared to 45 students in Fall 2014).

Use of Results

Use of Results

Some of the low scores on these labs are related to absenteeism, students not wanting to do outside classroom assignments, and turning work in late. (Dr. Baghai-Riding usually does not allow a student to make-up a missed lab. However, one lab grade is dropped when calculating final grades.) Some students did not turn in these labs because they often required graphing data as well as simple calculations

(determining percents and ratios). More effort in 2015/2016 will be made to complete the labs during lab time. More emphasis has been placed on attending laboratory sessions. A two-hour lab is worth two attendance points rather than one. Students must sign in at the start of a lab and sign out at the end of a lab session. Giving two points is an incentive for students not to cut out of a lab. Attendance and classroom participation is worth 10% of their final grade. In addition, Dr. Baghai-Riding has provided some practice quizzes on Canvas for some of the course content These quizzes help students prepare for the labs and upcoming exams and are worth three points each.

BIO_110_GE10: Values

Start: 7/1/2014
End: 6/30/2015
Gen Ed learning outcome (competency)
Facilitating the search for moral, social, and ethical values and their roles in making decisions and assuming personal responsibilities

Data Collection
Lecture, laboratory, and outside classroom assignments are used that generate student awareness of about biological issues that focus on population growth, applications of DNA (forensic studies, cloning, human genome project), and conservation issues (saving endangered species, destruction of ecosystems, etc.). Lecture exams were used primarily to evaluate this learning objective. Major goal is for 80% of the students to receive an 80% or better on the three written exams. This learning objective will not be evaluated starting Fall 2015 since learning objective competencies was reduced from 10 to 5.

Results of Evaluation
BIO 110 - Fall 2014 semester - 38% of students scored 80% or better for exam 1, 53.3% for exam 2, and 55.6% for exam 3. In Spring 2015 sections, 55.5% of students scored 80% or better for exam 1, 50% for exam 2, and 58.5% for exam 3. Dr. Baghai-Riding's class size was larger for spring semester (51students completed the course in Spring 2015 compared to 45 students in Fall 2014).

Use of Results
Some of the low scores were due to students not turning in the assigned homework that is worth 20% of each exam, not attending review sessions, and not taking advantage of the study guide that is provided. Section 1 initially had 6 students over capacity due a scheduling error The large class size also may have impacted student learning. Students may have been more afraid to ask the instructor questions as well as feel that they were an integral part of the class. Also the lecture was not taught in the science building due to renovations. Props to help in explaining concepts were not available since they were packed away in boxes. More effort in 2015/2016 will be made to review class material during any extra lab time that is available. More interactive practice quizzes pertaining to course content also will be designed to help students understand course content. More props will be used since biology building renovations have been completed.

Section IV.a

Brief Description

Narrative

The Department of Biological Sciences is the administrative home of two undergraduate degree programs (B.S. in Biology, B.S. in Environmental Science) and two graduate degrees (M.S. in Natural Sciences, MAS-GIT in Remote Sensing). Several options, specifically designed for students pursuing certain career pathways, are available through each of these degree programs. The overwhelming majority of the students in the department identify themselves as working toward completion of requirements necessary for admission to professional school in medicine, dentistry, physical therapy, pharmacy, veterinary medicine, occupational therapy, and other allied health professions. The environmental science degree program offers students opportunities to acquire skills necessary to compete in a growing occupational market; and is working closely with DSU's Center for Interdisciplinary Geospatial Information Technologies to provide state-of-the-art resources to majors interested in solving big problems with contemporary solutions. A substantial contribution to the university is made by the department to providing science instruction to students as part of DSU's General Education Curriculum.

Section IV.b

Comparative data

Enrollment, CHP, majors, graduation rates, expenditures, trends, etc.

Narrative

The following information contains Summer 2014, Fall 2014, and Spring 2015 credit hours produced, enrollment, and graduates for the B.S. Biology, B.S. Environmental Science, M.S. Natural Science degree programs for academic year 2014/15.

CREDIT HOUR PRODUCTION						
	Summer 2014		Fall 2014		Spring 2015	
	UG	GR	UG	GR	UG	GR
BIO	317	38	2429	48	2235	45

ENROLLMENT BY MAJOR*						
	Summer 2014		Fall 2014		Spring 2015	
	UG	GR	UG	GR	UG	GR
Biology	57	0	182	0	154	0
Environmental Science	1	0	33	0	38	0
Natural Science	0	4	0	9	0	8
Total	58	4	215	9	192	8

2014/15 Graduates**	
Biology	
BS	**33**
Environmental Science	
BS	**3**
Natural Sciences	
MSNS	**5**

*Note there were 5 students enrolled in Environmental Science as a second major in both Fall 14 and Spring 15 and 1 student enrolled in Environmental Science as a second major in Summer 14. These were not counted in the above chart.

**Note there was 1 student who graduated with a second major in Environmental Science not counted in the above chart.

The following information contains Summer 2014, Fall 2014, and Spring 2015 credit hours produced, enrollment, and graduates for academic year 2014/15 for MAS-GIT degree program.

CREDIT HOUR PRODUCTION						
	Summer 2014		Fall 2014		Spring 2015	
	UG	GR	UG	GR	UG	GR
GIS	0	120	105	69	123	66
REM	0	21	0	33	39	30
TOTAL	0	141	105	102	162	96

ENROLLMENT BY MAJOR						
	Summer 2014		Fall 2014		Spring 2015	
	UG	GR	UG	GR	UG	GR
Geospatial Information Technology	0	16	0	12	0	12

2014/15 Graduates*	
Geospatial Information Technology	
MAS	12

**Note that one additional degree is pending until the grade for an internship is received.*

Section IV.c

Diversity Compliance Initiatives and Progress

Narrative

The Department of Biological Sciences exists as one of the most diverse academic units on the Delta State University campus and we are committed as a faculty to promoting and maintaining the diverse population of faculty members as well as students that we teach. A national search for an Assistant Professor of Biology (Science Education) was initiated in Fall 2014 to fill an interim position left by Dr. Malcolm Mckewen's retirement and the search committee took diversity into account as applications for the position were reviewed. Dr. Robert Kagumba was hired as a new departmental faculty member in spring 2015.

Section IV.d

Economic Development Initiatives and Progress

Narrative

Departmental faculty (Baghai-Riding, Blackwell and Reza) have been involved in discussions with relevant stakeholders regarding the re-opening of the Great River Road State Park in Rosedale, MS. The park has been used as a natural resource for departmental courses and research and holds potential as a tourism attraction.

Section IV.e

Grants, Contracts, Partnerships, Other Accomplishments

Narrative

New Awards:

A Mississippi INBRE (IDeA Network of Biomedical Research Excellence), administered through the University of Southern Mississippi was awarded to Dr. Séverine Groh in the amount of $25,000 to fund "Creation of an Upper Level Cell Physiology Laboratory Course". A cell culture room has been established in the newly renovated Caylor-White-Walters facility and the new course was offered in Summer II 2015 .

A Mississippi INBRE (IDeA Network of Biomedical Research Excellence), administered through the University of Southern Mississippi was awarded to Dr. Jira Katembe in the amount of $25,000 to fund "Replacement of Core Instrumentation for Enhancement of Biotechnology Program". Laboratory equipment and supplies will be purchased to support DNA science/biotechnology and cell biology courses and perform experiments, which include DNA analysis, cell transformation and culturing.

"Use of Unmanned Aerial Vehicles to Enhance Learning and Research." was awarded to Dr. Yongqin Zhang and Dr. Eric Blackwell in the amount of $1000 through an Office of Instructional Technology Challenge Grant. Funds were used to purchase drone technology for courses and research in the MAS-GIT and BS Environmental Science degree programs.

"Acquiring a LaCie Hard drive 4 big USB 3.0 12 TB drive" was awarded to Dr. Nina Baghai-Riding in the amount of $1000 to purchase external hard drives for Scanning Electron Microscope (SEM) images. Fall 2014.

A Bryce Griffis faculty development grant was awarded to Dr. Nina Baghai-Riding in the amount of $500 for processing palynological samples from Jurassic and Tertiary Formations throughout the Western Interior and southern Mississippi. Fall 2014.

A Bryce Griffis faculty development grant was awarded to Dr. Ahm Reza for course improvements for BIO 461/561 (Mammology) in the amount of $500. Fall 2014.

A Dulce faculty development grant was awarded to Dr. Ellen Green in the amount of $250 for vegetable seeds and supplies for the Delta State University Wiley Community Garden. Fall 2014.

A Delta State University Alumni Foundation Excellence in Science grant for implementing an international teaching opportunity in Indonesia was awarded to Dr. Ahm Reza in the amount of $2200.

Although awarded in previous years, spending continued for the following multi-year award grants:

Collaborator, Nina Baghai-Riding, National History Collections: Magnolia grandiFLORA digitally linking herbaria to support botanical research and education in Mississippi. NSF 11-558 awarded for $94,031. This grant is for a five year time period and is coordinated with Lisa Wallace at Mississippi State University.

Renewed funding through a NASA sub-grant from the University of Mississippi, administered by Dr. Chuck Smithart for the AY 2014-15. Total award for both science departments is believed to be $10,000. The NASA sub-grant is not automatically awarded to the departments and has to be reapplied for again each year.

Although awarded in 2013, the Scanning Electron Microscope (SEM) purchased through a NSF Major Research Instruments (MRI) grant in the amount of $208,000 was delivered and installed in Fall 2014. Dr. Nina Baghai-Riding, as principle investigator on the grant, collaborated with science faculty Dr. John Tiftickjian, Dr. Barry Campbell, Dr. Charles Smithart, Dr. Jira Katembe, and Dr. Séverine Groh.

Section IV.f

Service Learning Data

List of projects, number of students involved, total service learning hours, number of classes, faculty involved, accomplishments.

Narrative

In BIO 340 General Entomology, course participants continued work initiated in previous years to further expand the butterfly garden at Dahomey National Wildlife Refuge. Additional plants designed to attract butterflies and other pollinators were planted by students at designated points on the refuge for the purpose of building an educational and community resource.

Section IV.g

Strategic Plan Data

Only use this section if you have strategic plan info to report that is not covered in other areas of your report

Narrative

None

Section IV.h

Committees Reporting To Unit

Each unit includes in the annual plan and report a list of the committees whose work impacts that unit or any other aspect of the university; along with the list will be a notation documenting the repository location of the committee files and records. Committee actions affecting the unit's goals may be noted in other applicable sections of the annual reports. Not required to be included in the unit's annual plan and report, but required to be maintained in the repository location, will be a committee file that includes, for each committee: Mission and by-laws, Membership, Process, Minutes.

Narrative

The minutes for all committee meetings are maintained in the Department of Biological Sciences temporary office in Gibson-Gunn 122, unless otherwise specified. Upon completion of faculty searches, most search committee meeting minutes are turned over to the Human Resources office according to University policy. Committee memberships are automatic in some cases (*e.g.*, all biology faculty members are on the Biology & Environmental Sciences Curriculum Committee); other committee assignments are made through a combination of faculty interests and department chair's decision.

Biology & Environmental Sciences Curriculum Committee
Chair of the Committee is Nina Baghai-Riding; Members of the Committee during AY 2014-2015 included A.H.N. Ali Reza, Eric Blackwell, Barry Campbell, Lacey Fitts, Severine Groh, Jira Katembe, Tanya McKinney, John Tiftickjian and Yongqin Zhang.

Department of Biological Sciences Tenure & Promotions Committee
Chair of the Committee is Dr. Jira Katembe; Members of the Committee during AY 2014-2015 included Nina Baghai-Riding, Eric Blackwell, Barry Campbell, Jira Katembe, Tanya McKinney and John Tiftickjian.

Safety and Security Committee
Chair of the Committee is Eric Blackwell; Members of the Committee during AY 2014-2015 included Nina Baghai-Riding, Ellen Green and John Tiftickjian.

Student Recruitment & Retention Committee
Chair of the Committee is Tanya McKinney; Members of the Committee during AY 2014-2015 included Ellen Green, Severine Groh and A.H.M. Ali Reza.

Academic Awards and Scholarships Committee
Chair of the Committee is Tanya McKinney; Members of the Committee for AY 2014-2015 included Ellen Green, Eric Blackwell, and Severine Groh.

Instructional Technology Committee
Chair of the Committee is John Tiftickjian; Members of the Committee during AY 2014-2015 included Nina Baghai-Riding, Jira Katembe, and Lacey Fitts.

MAS-GIT Admissions and Curriculum Committee
Chair of the Committee is Yongqin Zhang; Members of the Committee during AY 2014-2015 included Eric Blackwell and Talbot Brooks

MSNS Admissions and Curriculum Committee
Chair of the Committee is Nina Baghai-Riding; Members of the Committee during AY 2014-2015 included

Joe Bentley, Eric Blackwell, Lacey Fitts, Ellen Green, Severine Groh, Sharon Hamilton, Chris Jurgenson, Jira Katembe, Tanya McKinney, Ali Reza, Chuck Smithhart, John Tiftickjian and Yongqin Zhang

Section V.a

Faculty (Accomplishments)

Noteworthy activities and accomplishments

Narrative

Publications

Croft, H., Chen, J., **Zhang, Y**., Simic, A., Noland, T., Nesbitt, N., Arabian, J. 2015. Evaluating leaf chlorophyll content prediction from multispectral remote sensing data within a physically-based modeling framework. *ISPRS Journal of Photogrammetry and Remote Sensing.* 102: 85-95.

Croft, H., Chen, J., **Zhang, Y**., Simic, A., Noland, T. 2014. Leaf chlorophyll content estimation from broadband Landsat TM 5: model development and validation. *International Journal of Remote Sensing* (in press).

Croft, H., Chen, J., **Zhang, Y**., 2014. Temporal disparity in leaf chlorophyll content and leaf area index across a growing season in a temperate deciduous forest. *International Journal of Applied Earth Observation and Geoinformation*. 33: 312-320

Croft, H., Chen, J., **Zhang, Y.,** 2014. The applicability of empirical vegetation indices for determining leaf chlorophyll content over different leaf and canopy structures. *Ecological Complexity.* 17: 119-130.

Olivi, B., Lemoine, J., **Baghai-Riding**, **N. L.** and Blackwell, E. Census of the Delta State University Woody Plant Community and Its Implications for Ecosystem Health (resubmitted to BIOS, June 2014 for publication). – Currently accepted for publication.

Rahman, S.C., **Reza, A.H.M.A.,** Dutta, R., Jenkins, C.L., and Luiselli, L. 2014. Niche partitioning and population structure of sympatric mud snakes (Homalopsidae) from Bangladesh. *Herpetological Journal*. Vol. 24 (April 2014): 123-128pp.

Book Chapters

Zhang, Y., Wilson, T., **Blackwell, E**. 2015. GIS in Biological Science Education and Research. In: *"GIS and STEM in Higher Education"* Edited by Dr. David J. Cowen, ESRI Press. (Accepted)

Reza, A.H.M.A. 2014. Status, distribution and conservation of the Amphibians of Bangladesh. In: Conservation Biology of Amphibians of Asia: *Status of Conservation and Decline of Amphibian: Eastern Hemisphere*. (Edited by Heatwole, H. and Das, I.). Natural History Publications (Borneo), Kota Kinabalu, Malaysia. ISBN: 978-983-812-154-5. (More information: http://www.nhpborneo.com/book/amphibians-asia/)

Scholarly presentations

Gundry, S., Clark, M. and **Reza, A.H.M.A**. 2015. Habitat use and seasonal food habits of Coyote (*Canis latrans*) in Dahomey National Wildlife Refuge, Mississippi. 79th Annual Meeting of Mississippi Academy of Sciences. February 26-27, 2015. Hattiesburg, MS. *Journal of Mississippi Academy of Sciences*. 60(1): 85. [Student Oral Presentation]

Holland, T.B., and **Reza, A.H.M.A.** 2015. Effects of human interaction of Squirrels in Mississippi River Delta. 79th Annual Meeting of Mississippi Academy of Sciences. February 26-27, 2015. Hattiesburg, MS. *Journal of Mississippi Academy of Sciences*. 60(1): 152. [Student Poster Presentation]

Ball, Rhandi, Bruce, Walthena, Eads, Dylan, Hall, Darryl, Hughes, Jeffrey, Patterson, Kenneth, and **Baghai-Riding, Nina L,**. 2015, Diversity of bird species at Bear Pen Park, Cleveland, , Mississippi, Mississippi Academy of Sciences Presented in the Ecology and Evolutionary Biology section (poster presentation)

Bishop, Amanda, Cummings, Joseph, Clark, Megan, Manley, Michael, Simpson, Rebecca, Napier-Jameson, Rebekah, Moreton, Steve, and **Baghai-Riding, Nina**, 2015, Invasive species versus native species present on Delta State University Campus in Cleveland, Mississippi, Mississippi Academy of Sciences Presented in the Ecology and Evolutionary Biology section (poster presentation)

Kandies, Amanda, Little, Sara Beth, Stevens, Tyler, Huff, Mary, and **Baghai-Riding, Nina**, 2015, Aquatic invertebrate study of Christmas Lake Branch, Dahomey National Wildlife Refuge, Boyle, Mississippi. Mississippi Academy of Sciences Presented in the Ecology and Evolutionary Biology section (poster presentation)

Dangles, Lauren N., Myrow, Paul M., Chen, Jitao, **Baghai-Riding, Nina** L., Hotton, Carol L., Schumacher, Bruce A.[6], and Hager, Alex. 2014. Triassic-Jurassic strata of the Colorado Springs region and associated palynofloras. Geological Society of America, Rocky Mountain Section Regional Meeting.

Wallace, Lisa; Alford, Mac; **Baghai-Riding, Nina**; Baker, Crystie; McCook, Lucile; McNair, Daniel; Rohnke, Angel; Sullivan, Heather; 2014, *Magnolia grandiFLORA*: a Virtual Resource of Plant Diversity in Mississippi. Botanical Society of America, Boise, Idaho. http://www.2014.botanyconference.org/engine/search/index.php?func=detail&aid=462.

Baghai-Riding, Nina Lucille, Davis, Kendal, Hotton, Carol, Myrow, Paul, Dangles, Lauren. 2014. Palynomorphs from the Base of the Late Jurassic Morrison Formation, Colorado Springs, Colorado, U.S.A. Botanical Society of America, Boise, Idaho. http://www.2014.botanyconference.org/engine/search/index.php?func=detail&aid=529

Baghai-Riding, N. L. 2014. Designing Research Posters Using Adobe Illustrator, Technology in Teaching Symposium, Delta State University on April 4, 2014

Chen, J., Holly C., Arabian, J., Nesbitt, N., He, Y., Shang, J., **Zhang, Y**., Simic, A., Noland, T., Hoffman, T., Liu, J. 2015. Validation of a two-Step model inversion approach for regional retrieval of leaf chlorophyll content using remote sensing Data. Oral presentation and publication in Proceedings of *36th Canadian Remote Sensing Symposium.* June 8-11. *St. John's,* Newfoundland and Labrador, Canada.

Holly C., Chen, J., **Zhang, Y**., Staebler, R.M., Froelich, N., Chen, B., 2015. Temporal disparity between leaf area index and leaf chlorophyll content in temperate deciduous forests: Implications for GPP modeling. Oral presentation and publication in Proceedings of *36th Canadian Remote Sensing Symposium*. June 8-11. St. John's, Newfoundland and Labrador, Canada.

Zhang, Y., 2014. Integrating technologies in online teaching to engage students. 1st Technology in Teaching Symposium, April 4. Delta State University. Cleveland, MS.

Zhang, Y., 2014. Online teaching of Geospatial Information Technologies. **American Society for Photogrammetry and Remote Sensing** Annual Conference. March 23-28, Louisville, KY, USA.

Baghai-Riding, N. L., Kelley, J. R., and Swann, C. T. Palynological analysis of a sample from the Coon Creek Member, Union County, Mississippi (resubmitted corrections to Paleontology and Geology of the Coon Creek Formation and Its Equivalent Sections, Aug. 2014) – Currently accepted for publication.

Book Reviews

Dr. Severine Groh: Wiley, Principle of Anatomy and Physiology 14/e by Tortora and Derrickson. Reviewed one chapter of the textbook

None.

Section V.c

Administrators (accomplishments)

Narrative

Dr. Ellen Green was selected to participate in the 2014 Higher Education Resource Services (HERS) Summer Leadership Development program at Bryn Mawr College campus in Pennsylvania. This program provided a two-week intensive leadership training for women in Higher Education. Topics included: "Understanding the Environment for Higher Education", "Planning and Leading Change in the Academy", and "Mapping Your Leadership Development."

Building renovation: The Department of Biological Sciences worked closely with Facilities Management, Architecture South and the contractors to aid in facilitating the move into the newly renovated Caylor-White-Walters.

100% State Inventory Audit: The Department of Biological Sciences successfully completed a 100% inventory audit by the state that took place one week after a major personnel and equipment move due to the building renovation.

Chemical Inventory: Chemicals in biology labs were inventoried for the Fire Marshall in a professional database software. Material Safety Data Sheets (MSDS) are being generated for each chemical in each laboratory.

NCATE and SACS accreditation: The department successfully completed all required tasks associated with the accreditation of the departmental degree programs including the science education curriculum.

Programmatic review: The Masters of Science in Natural Sciences degree program went through program review in Fall 2014. The program was saved.

22nd Annual Elliott-Nowell-White Science Symposium: Coordinated all aspects of the annual symposium including setting up various meetings, proofread and heavily edited the program materials and served as host for visiting guests.

Catalog review: Completed catalog review of courses that had not been taught in five or more years for all departmental degree programs.

Developed four year plans of study for the B.S. in Biology and B.S. in Environmental Science degree program concentrations.

Section V.d

Positions(s) requested/replaced with justification

Requested permission to fill Assistant Professor of Biology in Science Education position due to the retirement of Dr. Malcolm McEwen.

Narrative

The Department of Biological Sciences was given permission to perform a national search to fill the vacancy left by Dr. Malcolm McEwen's retirement from the science education faculty position in 2010. The position is needed due to the specific role and credentials required for the B.S. in Biology with a science education concentration at Delta State University. Dr. Robert Kagumba, PhD Science Education from Western Michigan State University, was hired in the spring of 2015 to begin work AY 2015-16.

Section V.e

Recommended Change(s) of Status

Narrative

Dr. Robert Kagumba was hired in Spring 2015 as Assistant Professor of Biology (Science Education) and will begin work in AY 2015-16.

Dr. Lacey Fitts completed her annual contract as the Interim Instructor for science education.

Section VI.a

Changes Made in the Past Year

Narrative

Changes made in the past year:
The following courses were deleted from the Department of Biological Sciences course offerings during AY 2014-2015 as they had not been offered in many years:

BIO	402	Microbial Genetics
BIO	343	Comp Vertebrate Anatomy
BIO	102	General Botany
BIO	103	General Zoology
BIO	105	Introd to Science & Technology
BIO	106	Intro to Sci Inquiry in Bio Sc
BIO	380	Environmental Sci Internship
BIO	499	Readings in Biology
BIO	659	Conservation Biology
BIO	121	Intro to Environmental Science
BIO	318	Advanced Microbiology
BIO	640	Evolution and Systematics
BIO	614	Prob in Teach Sci in Elem Schl
BIO	406	Plant Pathology
BIO	506	Plant Pathology
BIO	404	Economic Botany
BIO	464	Human Physiology

BIO	504	Economic Botany
BIO	664	Human Physiology
BIO	317	Microbiology
BIO	344	Fld Zoology Higher Vertebrates
BIO	419	Biostatistics
BIO	519	Biostatistics
BIO	364	Selected Topics in Mod Biology
BIO	641	Vertebrate Ecomorphology
BIO	201	Intro to Environmental Science
BIO	422	Water Pollution Biology
BIO	522	Water Pollution Biology
BIO	421	Limnology
BIO	438	Field Ichthyology
BIO	521	Limnology
BIO	689	Directed Research
BIO	111	Intro. to Field Biology and Ec
BIO	446	Aquatic Entomology
BIO	471	Economic Entomology
BIO	546	Aquatic Entomology
BIO	571	Economic Entomology
BIO	600	Seminar
BIO	538	Field Ichthyology
BIO	445	Animal Behavior
BIO	620	Advanced Biostatistics
BIO	690	Thesis
BIO	545	Animal Behavior
BIO	665	Pathophysiology
BIO	336	Invertebrate Zoology
BIO	449	Landscape Ecology
BIO	609	Research and Modeling
BIO	649	Landscape Ecology
BIO	420	Research Design & Analysis
BIO	611	Biology of Species
BIO	460	Comp Vertebrate Physiology
BIO	560	Comparative Vertebrate Physio
BIO	610	Biology of Communities
BIO	342	Field Zoology Lower Vertebrate
BIO	401	Ecology
BIO	430	Anatomy and Physiology
BIO	431	Anatomy and Physiology
BIO	531	Anatomy and Physiology
BIO	530	Anatomy and Physiology
BIO	501	Ecology
BIO	450	Scientific Illustration

BIO	550	Scientific Illustration
BIO	688	Taxonomy of Immature Insects
BIO	416	Soil Science and Biology
BIO	516	Soil Science and Biology

The following curriculum changes were approved due to the decrease in General Education requirement credit hours:

BIOLOGY (BACHELOR OF SCIENCE)
GENERAL EDUCATION
..... 40-43
See General Education requirements with the following exceptions:
Under Personal Development, CIS 205 is required for majors in Biology pursuing the Biology Education concentration.
CHE 101, CHE 102, CHE 103 and CHE 104 are required for all Biology concentrations
SPECIAL DEGREE REQUIREMENTS
.....3-6
Mathematics (3-6 hours)
For general biology and premedical science concentrations,
select one of the following combinations:
MAT 105, 251 (6 hours)
MAT 105, 300 (6 hours)
MAT 251, 252 (6 hours)
MAT 251, 300 (6 hours)
For biology education concentration:
MAT 105 (3 hours) or
MAT 251 (3 hours)
PROFESSIONAL EDUCATION
..... 25
(Biology Education concentration only)
HSE 144; CUR 300, 393, 493, 498; CSP 340; EPY 341
MAJOR
..... 44-74
Biology Core: (20 hours)
BIO 100, 101, 300, 301, 328
Select one of the following concentrations (24-54 hours):
General Biology (24-32 hours)
Select four approved courses at the 400-level (12-16 hours)
All 400-level courses are eligible with the exception of BIO 470
BIO electives (12-16 hours)
All BIO courses, 200-level and above, are eligible except those specifically described as "not for biology major credit."
Premedical Science (with Chemistry minor, 46-54 hours)
Select four approved courses at the 400-level (12-16 hours)
All 400-level courses are eligible with the exception of BIO 470
BIO electives (12-16 hours)
All BIO courses, 200-level and above, are eligible except those specifically described as "not for biology major credit."
CHE 319/321, 320/322, 440 (14 hours)
PHY 221/233, 222/234 (8 hours)
Biology Education (32-37 hours)
ENG 303 (3 hours)
CHE 215/216, 325/326 (8 hours)

PHY 110 (3 hours)
Select one of the following (3-4 hours)
PHY 205, 314
BIO 217, 230, 435 (12 hours)
BIO 348 (suggested, but not required, 0-3 hours)
Biology elective (300-level or above, 3-4 hours)
ELECTIVES
..... 0-34
General Biology (23-34 hours)
Premedical Science (1-12 hours)
Biology Education (0-4 hours)
TOTAL DEGREE REQUIREMENTS
.....124

ENVIRONMENTAL SCIENCE
(BACHELOR OF SCIENCE)
GENERAL EDUCATION
..... 40-43
See General Education requirements with the following exception:
Under Prospective on Society, GEO 303 is required for majors in Environmental Science pursuing the Geospatial Technologies concentration.
CHE 101, CHE 102, CHE 103 and CHE 104 are required for all Environmental Science concentrations
SPECIAL DEGREE REQUIREMENTS
..... 6
Mathematics (6 hours)
MAT 105, 251 (6 hours)
MAT 105, 300 (6 hours)
MAT 251, 252 (6 hours)
MAT 251, 300 (6 hours)
MAJOR
..... 61-77
Environmental Science Core: BIO 100, 101, 301; GIS 202 (15 hours)
Select one of the following concentrations:
General Environmental Science (46-54 hours)
Required: BIO 123, 217, BIO 314 or PHY 314, BIO 415, CHE 215, 216 (19 hours)
Select one of the following 200- or 300-level courses (3-5 hours):
BIO 221, 309, 312, 321, 328, 340; CHE 311, 351; PHY 221/233
Select three of the following 400-level courses (9-12 hours):
BIO 404, 405, 408, 410, 411, 414, 416, 439, 440, 442, 447, 459, 461, 462, 463, 477, 478; CHE 434, 440, 460
Select three from (9-12 hours):
Any BIO 300- or 400-level course, any CHE 300- or 400-level course, or GIS 330, with the exception of BIO 348
Select any two of the following social science courses (6 hours).
GEO 407, 416, PSC 302, SOC 421, 422, 485
Geospatial Technologies (55-62 hours)
Required: ART 122, BIO 123, 415, GIS 200, 310, 490, REM 316
(22 hours)
Select two of the following:
Any GIS or REM electives numbered 300 or above (6 hours)
Select three of the following (9-12 hours):
BIO 217, 221, 309, 312, 321, 328, 336, 340; CHE 319, 320, 321, 322; PHY 202, 256; BIO 314 or PHY 314

Select four of the following (12-16 hours):
BIO 402, 404, 405, 406, 408, 410, 411, 414, 416, 425, 439, 440, 447, 449, 459, 461, 462, 463, 470, 477, 478; CHE 434
Social Science Electives - select two of the following (6 hours):
GEO 407, 416; PSC 302,; SOC 421, 422, 426, 485
Wildlife Management (53-56 hours)
Required: BIO 221, 309, 321, 459, 463 (18 hours)
Biology, select three of the following (10-12 hours):
BIO 217, 328, 336, 340, 415, 425, 440, 447, 470, 477, 478
Vertebrate zoology, select two of the following (8 hours):
BIO 439, 461, 462
Botany, select three of the following (10-11 hours):
BIO 312, 405, 406, 408, 410, 411
(at least one must be BIO 312 or 411)
Geospatial technology, select one of the following (3 hours):
GIS 310, 330, 361, 461, REM 411, 461
Physical Science, select one of the following (4 hours):
PHY 221 and 233
OR
Select one of: BIO 314, 416, PHY 314
ELECTIVES
..... 0-17
General Environmental Science (6-17 hours)
Geospatial Technology (0-8 hours)
Wildlife Management (4-10 hours)
TOTAL DEGREE REQUIREMENTS 124

The following is the curriculum for the MAS-GIT program at the present time:

Curriculum: 24 hours required courses, and 6 hours approved electives.
Fall 9
.....
GIS 602. Introduction to Geospatial Science and GIS (GISI)..... 3
GIS 661. Geospatial Mathematics, Algorithms, and Statistics..... 3
REM 616. Remote Sensing.....
3 9
Spring
.....
REM 611. Digital Image Processing..... 3
GIS 610. Advanced GIS (GIS II)..... 3
GIS 631.Photogrammetry.....3
Summer I (Select 1)3
.....
GIS 551. Business Geographics.....
3
GIS 570. Programming GIS.....
3
GIS 681. Community Growth.....
3
Summer II (Select 1)3
.....
REM 641. Advanced Sensor Systems and Data Collection..... 3
GIS 580. GIS for the Internet and Spatial Databases..... 3
REM 631. Info. Extraction from Multi/Hyper&Lidar..... 3

Following **Fall** 6
.....
GIS 690. GIS Capstone.....
6
TotalSemester **hours** 30
.....

Section VI.b

Recommended Changes for the Coming Year

Narrative

The Department of Biological Sciences continues to conduct a review of the M.S.N.S. graduate degree program. The M.S.N.S. Curriculum Committee is exploring the option of offering a Post-baccalaureate Certificate in line with other certificate programs currently offered in Mississippi such as at William Carey, UMMC and Mississippi College. The Committee is also exploring the addition of a concentration in Environmental Science research.

A capstone experience is being discussed by the department that will provide graduating seniors with a cumulative experience that will both strengthen their backgrounds in biology content areas, research skills and enhance their technical writing skills.

Lastly, the department will submit a request to increase laboratory course fees for AY 2015-16.

DELTA STATE UNIVERSITY

Institutional Research & Planning
Kent Wyatt Hall 161
(662) 846-4052

To: Dr. Ellen Green, Chair; Department of Biological Sciences

From: Office Institutional Research & Planning

Date: July 24, 2015

Subject: Academic Year Report Information for the Department of Biological Sciences

The following information contains Summer 2014, Fall 2014, and Spring 2015 credit hours produced, enrollment, and graduates for academic year 2014/15. If you need additional information, or have any questions regarding this information, please contact IRP at x4052.

CREDIT HOUR PRODUCTION								
	Summer 2014			Fall 2014			Spring 2015	
	UG	GR		UG	GR		UG	GR
BIO	317	38		2429	48		2235	45

ENROLLMENT BY MAJOR*								
	Summer 2014			Fall 2014			Spring 2015	
	UG	GR		UG	GR		UG	GR
Biology	57	0		182	0		154	0
Environmental Science	1	0		33	0		38	0
Natural Science	0	4		0	9		0	8
Total	58	4		215	9		192	8

2014/15 Graduates**	
Biology	
BS	33
Environmental Science	
BS	3
Natural Sciences	
MSNS	5

*Note there were 5 students enrolled in Environmental Science as a second major in both Fall 14 and Spring 15 and 1 student enrolled in Environmental Science as a second major in Summer 14. These were not counted in the above chart.

**Note there was 1 student who graduated with a second major in Environmental Science not counted in the above chart.

Credit Hour Production							
	Summer		Fall		Spring		
	UG	GR	UG	GR	UG	GR	Total
Biology							
AY 2015	317	38	2429	48	2235	45	5112
AY 2014	175	0	2238	38	2035	39	4525
AY 2013	192	9	2494	71	1938	60	4764
AY 2012	238	0	2,214	20	1,968	23	4463
AY 2011	227	0	2345	6	1966	4	4548
AY Totals							
AY 2015	317	38	2429	48	2235	45	5112
AY 2014	175	0	2238	38	2035	39	4525
AY 2013	192	9	2494	71	1938	60	4764
AY 2012	238	0	2,214	20	1,968	23	4463
AY 2011	227	0	2345	6	1966	4	4548

Graduates				
	Biology	Env Sci	Nat Sci	
	BS	BS	MSNS	Total
AY 2015	33	3	5	41
AY 2014	40	5	1	46
AY 2013	39	4	2	45
AY 2012	19	5	0	24
AY 2011	34	3	0	37

Enrollment by Major						
	Summer		Fall		Spring	
	UG	GR	UG	GR	UG	GR
Biology						
AY 2015	57	0	182	0	154	0
AY 2014	48	0	206	0	193	0
AY 2013	68	0	237	0	185	0
AY 2012	64	0	233	0	194	0
AY 2011	79	0	206	0	181	0
Environmental Science						
AY 2015	1	0	33	0	38	0
AY 2014	3	0	21	0	18	0
AY 2013	6	0	28	0	23	0
AY 2012	9	0	23	0	22	0
AY 2011	6	0	22	0	20	0
Natural Science						
AY 2015	0	4	0	9	0	8
AY 2014	0	4	0	7	0	5
AY 2013	0	2	0	6	0	5
AY 2012	0	1	0	2	0	4
AY 2011	0	0	0	1	0	1
AY Totals						
AY 2015	58	4	215	9	192	8
AY 2014	51	4	227	7	211	5
AY 2013	74	2	265	6	208	5
AY 2012	73	1	256	2	216	4
AY 2011	85	0	228	1	201	1

**2015 data is for Biological Sciences department only. Historical data was pulled from the prior Biological and Physical Sciences Department report. MSNS data is identified and reported by concentration.*