Division of Biological and Physical Sciences  
College of Arts and Sciences  
Delta State University  

Annual Report  

Academic Year 2005-2006  

Unit Mission Statement  

Educational Learning Outcomes  

Unit Goals for 2005-2006  

Unit Data  

Personnel  

Degree Program Changes  

Unit Goals for 2006-2007  

Submitted by:  

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Unit Administrator
Mission Statement

The mission of the Division of Biological and Physical Sciences is to provide quality instruction in the natural sciences, to encourage students to perform to their full potential, and to instill a scientific attitude that will develop scientifically literate, educated professionals. The Division 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 Division 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.

I. Educational Program Learning Outcome Assessment Plan

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Data Collection and Analysis</th>
<th>Results of Evaluation</th>
<th>Use of Evaluation Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>What should a graduate in this major know, value, or be able to do at graduation and beyond?</td>
<td>What assessment tools and/or methods will you use to determine achievement of the learning outcome? Describe how the data from these tools and/or methods will be collected. Explain the procedure to analyze the data.</td>
<td>What were the findings of the Analysis Team? List any specific recommendations.</td>
<td>What changes in curriculum, courses, or procedures were made as a result of the program learning outcome assessment process?</td>
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<td>Biology, chemistry, and environmental science majors should be able to identify and apply the basic concepts taught in the core major courses</td>
<td>A “senior exam,” designed by faculty who teach core biology courses, has been given for the past several years for all biology and environmental science majors. The exam items are categorized so the weaknesses in core concepts can be identified. We currently studying the suitability of using a national ACS exam for similar use for chemistry majors.</td>
<td>Administration of the senior exam has suggested that improvement is needed in several core content areas, notably cell and molecular biology.</td>
<td>Course syllabi are being reviewed and will be adapted where necessary.</td>
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<td>Premedical and predental students should have a firm foundation in basic concepts covered on the MCAT and DAT national exams. This outcome applies to both premedical biology majors and chemistry majors.</td>
<td>Practice MCAT exams are given yearly to premedical and pre-dental students who take our MCAT/DAT preparation course. The results of these practice tests can identify content areas that need improvement.</td>
<td>MCAT scores have not been at the level we would like in recent years. Pre-health advisors are analyzing recent score data to attempt to identify how course content and/or curriculum could be changed to improve scores.</td>
<td>The division has designated a pre-health advising committee composed of faculty who advise any pre-health students. One of the duties of this committee will be to study MCAT and other admission test data and make recommendations for changes in course content, curriculum structure, and advising methods aimed at improving scores.</td>
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Students in all majors should be able to analyze scientific data, develop hypotheses, interpret experimental results, draw conclusions, and present outcomes to an audience. Selected chemistry and biology majors engage in internships, course-based field and laboratory projects, and present their results. Students involved in internships are generally required to submit a summary report of their projects. We encourage students to present research results at poster presentations of regional or national meetings of scientific societies. Several students have attended scientific meetings with faculty to present posters or presentations. Evaluation by involved faculty members have critiqued student performance. Evaluation is done on an individual basis involving all faculty who have overseen the projects. Division curriculum committee has been discussing how to involve more students in these kinds of activities. The recommendation is that we add to the curriculum a portfolio mechanism that will require all students in all majors to take part in a two-year process that will lead to individual studies and presentations to fellow students.

Students in the biology major will be able to understand and apply a cross section of concepts in their freshman year that will lead to adequate preparation of mid-level core courses and upper-level elective courses. The division curriculum committee has collected data on the current structure of BIO 100, 102, and 103, the introductory courses with regard to concepts covered, order of presentation, and suitability for first-year biology majors. Syllabi of current courses have been compared and discussed. Careful analysis of these courses has led biology faculty to question the length of time students should be required to spend on introductory concepts before advancing to mid-level core courses. Analysis indicated that the concepts covered in the present 3-semester curriculum could be redesigned as a 2-semester sequence. The would reduce duplication and enable students to advance to mid-level core courses more rapidly. The curriculum committee has recommended that the division convert the current 3-semester introductory sequence to a 2-semester general biology sequence, merging the now separate botany and zoology courses in to the general biology sequence. This change is being proposed to begin in fall of 2007.

II. Division Goals for 2005-2006

Goal 1. Provide adequate space, equipment, and resources so that students have the opportunity to develop research and technological skills required for success in their future employment or professional or graduate training. This goal is applicable to all degree programs.

Institutional goal supported by this goal

The division strives to maintain currency and appropriateness of its programs by adequately addressing basic skills, knowledge, and competencies. We are expected to optimize and improve the use of instructional technology. We are challenged to do more to encourage research and creative activities and to increase experiential learning components in our programs. This goal supports strategic plan goal #1: “Enhanced academic programs will ensure that graduates are well prepared for successful careers and ready to contribute to the civic life of their communities.”

Evaluation procedure

Standing division committees on curriculum and facilities along with individual faculty will continually examine our facilities, resources, and programs relative to good practice standards in science education and professional employment requirements. Areas in need of development will be identified and recommendations for improvement made. Records of recommendations, requests, and acquisitions relative to appropriate space, equipment, and resources and their use in enhancement of research opportunities will be used to assess success in meeting this goal. Assessment will also be based on examination of course syllabi that relate the incorporation of research and technological skill-building.
experiences.

Results of evaluation

The number of courses employing technology in the lecture environment exceeded the number of appropriately equipped classrooms. Aging microscopes need to be replaced in several biology laboratories. Aging equipment in chemistry laboratories are in need of upgrading or replacement. The Wiley Planetarium is in need of upgrading, especially with respect to the main projection mechanism. Student access to computers for general use and Internet access needs to be increased.

Use of evaluation results

Plans were made in consultation with the Office of Information Technology to increase technology access by adding data projection/Internet access in three lecture rooms in Caylor-White and Walters Halls. Data projectors, screens, and computer systems were added to Caylor 205, Walters 174, and Walters 250. All of these systems were in use by the end of Spring semester 2006 or will be in operation by Fall of 2006.

Access to the student computer lab in Walters hall has been improved and there are plans to continue to update this facility. This is providing a discipline-specific center where science students can access computer-aided assignments.

“Probe-ware” systems have been purchased for use in general and advanced laboratories. Such systems enable students to carry out experiments and collect data digitally for later analysis.

Goal 2. The division will evaluate and revise degree requirements where needed, especially with respect to pre-health programs that require coordination between the biological and physical sciences.

Institutional goal supported by this goal

The division is expected to maintain currency and appropriateness of its programs by adequately addressing basic skills, content, and competencies in undergraduate and graduate programs. Part of this expectation is to ensure that students who are pursuing pre-professional programs are properly prepared for advanced study in their chosen professional schools. This goal supports strategic plan goal #1:

“Enhanced academic programs will ensure that graduates are well prepared for successful careers and ready to contribute to the civic life of their communities.”

Evaluation procedure

Evidence used to measure the success in meeting this goal will be the documentation of degree requirements their relationship to preprofessional prerequisites published by medical and other health related professional schools.

Results of evaluation

This is an ongoing goal. The division re-evaluates pre-health requirements on a yearly based on information received from various professional schools. Results of these evaluations indicate that advisement of students requires modifications as requirements for professional programs change. As an example, the Physical Therapy program at the University of Mississippi Medical Center has recently been converted from a masters-level to doctorate-level program. This necessitated revision of course prerequisites for science students working toward this program.

Use of evaluation results

We will reestablish an active pre-health advisory committee composed of all faculty currently advising in the pre-health programs. This committee will collaborate on devising improved methods of advisement.

The premedical options under the biology and chemistry majors will be re-evaluated and revised.
where necessary so that premedical students are receiving the most appropriate curriculum to (1) prepare them for application to professional school, and (2) receive a broad background in either chemistry or biology, depending on their chosen major.

**Goal 3.** The division will devise an equitable formula for calculating faculty load that will be fair to all division faculty regardless of discipline.

**Institutional goal supported by this goal**

The University is committed to Teaching and Faculty Development. The quality of Delta State’s academic programs is central to its educational mission. That quality is partly depending on a workload that enables its faculty to devote sufficient time to instruction and mentoring of students and to personal development of improved teaching methods and engagement with students in research and other endeavors. This goal supports strategic goal #3: “the university community will benefit from better communication, effective operational and administrative systems, an optimal work environment, and a performance-responsive reward structure.”

**Evaluation procedure**

The division will evaluate teaching load with respect to each faculty member and where possible consider effort required in all teaching and related duties. Where inequities are found, and attempt will be made to modify stated division policy on calculation of load.

**Results of evaluation**

In the past there have been some inconsistencies in faculty loads when comparing biology to physical science faculty. This evaluation is ongoing

**Use of evaluation results**

Faculty load will fairly take into consideration the differences in effort related to lecture and laboratories duties. Laboratory credit will be defined based not strictly on credit hours but on a combination of student contact hours and consideration for preparation time.

Frequency of course offerings will be studied and modified where needed to ensure that faculty load is equitable while maintaining a reasonable cycle of courses so that students are not presented with difficulties in taking their required courses in a timely fashion.

Any change in load calculation will be done in a way that will not jeopardize faculty load specifications of accrediting bodies, notably the certification requirements of the American Chemical Society.

At present, the division has adopted a general policy of defining a full load as 15 contact hours.

**Goal 4.** Develop a plan for the renovation of the physical facilities of Caylor-White and Walters halls, emphasizing modernization of laboratory facilities, but also focussing on improved utilization of space and technology for state-of-the-art instruction.

**Institutional goal supported by this goal**

The University is committed to excellence in its academic programs and is committed to student scholarship and student engagement. Supporting theses commitments requires adequate and modern facilities. Representing the sciences, the division has a special responsibility to maintain classroom and laboratory facilities that provide the environment with scholarship and learning can be optimized.

**Evaluation procedure**

During the 2005-2006 year, the science faculty, guided by our renovation team, has worked with
Architecture South and laboratory design consultants hired by them to create an overall plan for the expansion and renovation of the science facilities.

Results of evaluation

Planning is ongoing. The overall plan for an addition to the building and reallocation of space in the existing building has been done. Detailed design of individual laboratories and other spaces will take place during 2006-2007.

Use of evaluation results

Planning and evaluation to continue
III. Division Data

Degree programs

Bachelor of Science with Major in Biology
- General Biology Concentration
- Pre-Medical Science Concentration
- Plant Science Concentration
- Industrial Biology Concentration
- Biology Education Concentration

Bachelor of Science with Major in Chemistry
- General Chemistry Concentration
- American Chemical Society Certified Concentration
- Pre-Medical Science Concentration
- Chemistry/General Science Education Concentration

Bachelor of Science with Major in Environmental Science
- General Environmental Science Concentration
- Wildlife Management Concentration

Master of Science in Natural Science

Number of majors (approximate) 275

Number of degrees awarded

- Fall 2005, BS Biology 18
- Fall 2005, BS Chemistry 5
- Fall 2005, MSNS 5
- Spring 2006, BS Biology 25
- Spring 2006, BS Chemistry 9
- Spring 2006, MS Environmental Science 1
- Spring 2006, MSNS 5
- Total for 2005-2006 68

IV. Personnel changes

- Dr. Sam Faulkner retired at the end of Spring 2006.
- Dr. Eric Blackwell completed his first year as Assistant Professor of Biology.
- Dr. Carlyle Meek was promoted to Professor of Physics
- Dr. Yasuhiro Kobayashi has been hired as Assistant Professor of Biology. He will join the Division in Fall 2006. He fills the position vacated by Sam Faulkner. His main discipline area is vertebrate physiology
- Dr. Alina Gabryszewska-Kukawa has been hired as Assistant Professor of Physics. She will join the Division in Fall 2006. She fills the position vacated by David Craig, who resigned two years ago. She will teach calculus-based physics, astronomy, and act as director of the Wiley Planetarium.
- Dr. Keith Hughes and Dr. Don Sudbrink resigned from the Division after the end of Spring 2006.
These resignations were not anticipated in advance.

- Mr. Dinesh Talreja has been hired for a one-year appointment for 2006-2007 to assume some of the responsibilities of Drs. Sudbrink and Hughes.
- The Division plans to perform faculty searches during 2006-2007 to permanently fill the positions vacated by Drs. Sudbrink and Hughes.

V. Degree Program/Curriculum Changes

- Added Wildlife Management concentration to BS, Environmental Science degree
- Removed BSE, Biology Education degree.
- Added Biology Education concentration to BS, Biology degree. The requirements for this concentration are identical to those of the eliminated BSE degree. This change was suggested as a way to consolidate programs and may the biology education option more consistent with the chemistry education concentration under the chemistry major.
- Added courses: BIO 221: Introduction to Wildlife Management, BIO 321: Wildlife Techniques, and BIO 463: Wildlife Habitat Management. These courses support the new wildlife concentration under the environmental science degree.

VI. Division Goals for 2006-2007

**Goal 1.** Develop a plan for the renovation of the physical facilities of Caylor-White and Walters halls, emphasizing modernization of laboratory facilities, but also focusing on improved utilization of space and technology for state-of-the-art instruction. Work on this goal began during 2005-2006 and continues during 2006-2007.

**Institutional goal supported by this goal**

The University is committed to excellence in its academic programs and is committed to student scholarship and student engagement. Supporting these commitments requires adequate and modern facilities. Representing the sciences, the division has a special responsibility to maintain classroom and laboratory facilities that provide the environment with scholarship and learning can be optimized.

**Evaluation procedure**

The science faculty, guided by our renovation team, will continue work with Architecture South and laboratory design consultants hired by them to evaluate and plan details of individual laboratories.

**Expected results**

Planning is ongoing. The overall plan for an addition to the building and reallocation of space in the existing building has been done. Detailed design of individual laboratories and other spaces will continue.

**Use of evaluation results**

Planning and evaluation to continue during 2006-2007

**Goal 2.** Provide adequate equipment, and resources so that students have the opportunity to develop research and technological skills required for success in their future employment or professional or graduate training. This goal continues from the past year.

**Institutional goal supported by this goal**

The division strives to maintain currency and appropriateness of its programs by adequately addressing basic skills, knowledge, and competencies. We are expected to optimize and improve the use of instructional technology. We are challenged to do more to encourage research and creative activities and to increase experiential learning components in our programs. This goal supports strategic plan goal
enhanced academic programs will ensure that graduates are well prepared for successful careers and ready to contribute to the civic life of their communities?

**Evaluation procedure**

Standing division committees on curriculum and facilities along with individual faculty will continually examine our facilities, resources, and programs relative to good practice standards in science education and professional employment requirements. Areas in need of development will be identified and recommendations for improvement made. Records of recommendations, requests, and acquisitions relative to appropriate space, equipment, and resources and their use in enhancement of research opportunities will be used to assess success in meeting this goal.

**Expected results**

We expect to identify which kinds of laboratory equipment are in the most critical need of replacement or upgrading. Examples of possible results: Aging microscopes may need to be replaced in several biology laboratories. Aging equipment in chemistry laboratories may need replacement. The Wiley Planetarium may require upgrading of its main projection mechanism. Student access to computers for general use and Internet access may be discovered to be inadequate.

**Use of evaluation results**

Evaluated needs will be enumerated and used to facilitate requests through granting agencies and other funding sources. Grant proposals will be aimed mainly at improvement of laboratory equipment and information technology facilities.

**Goal 3.** The division will work to continue to enhance the operations of the Center for Science and Environmental Education (CSEE) which provides both community service and university academic program components. The CSEE will work to meet the resource, professional development, and other educational support needs of Delta school districts, science teachers, and their students and to provide for continuing science education experiences for the broader community. This is an ongoing goal that began with the establishment of the Center.

**Institutional goal supported by this goal**

The University has identified as one of its goals to “strengthen the cooperative relationships with business, industry, community groups, government, and other educational institutions.” Through its emphasis on development of a comprehensive support structure for pre-college science education in the Mississippi Delta, the CSEE is assisting the University in meeting these goals by establishing partnerships with many of these entities. This goal supports strategic plan goal #5: “the citizens of the region will benefit from increases in university outreach, service, and partnership initiatives.”

**Evaluation procedure**

The CSEE will carefully track utilization of the programs and services that it offers during the coming academic year. Questionnaires will be used to collect information from individuals participating in CSEE programs and workshops.

**Expected results**

We expect the feedback received from participating schools to guide future direction of CSEE.

**Results of evaluation**

The CSEE will continue efforts to provide pre-college teacher workshops designed to improve the skill of area teachers to provide appropriate science instruction.
The Center will continue its efforts to provide instructional units associated with the Great Explorations in Math and Science (GEMS) program. The CSEE is a national network training site for the GEMS program.

The CSEE’s facility in Merigold, MS will continue to be enhanced and serve as a resource center for area science teachers. The division will continue efforts to expand the impact of CSEE and its programming on stakeholders in the Delta through an emphasizing development of a mechanism to insure its sustainability into the future.