Annual Report of Effectiveness

Academic Year 2004-2005

Unit Mission Statement

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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.

Unit Data

Degree programs

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

Bachelor of Science with Major in Chemistry
  General Option
  ACS Certified Option
  Pre-Medical/Biochemistry Option
  Science Teacher Certification Option

Bachelor of Science with Major in Environmental Science

Bachelor of Science in Education

Master of Science in Natural Science

Number of majors (approximate, as of Aug 2005) 325

Number of graduates
  Fall 2004, BS 12
  Fall 2004, MSNS 2
  Spring 2005, BS 26
  Spring 2005, MSNS 3

Graduate placement
  Accepted to professional schools 11
  Accepted to graduate programs 3
  Employed in science-related jobs 2

Personnel changes
  Dr. Nina Baghai Riding was awarded tenure
  Dr. Eric Blackwell was hired as Assistant Professor of Biology
  Dr. Thomas Lehman resigned
Significant faculty activities

Nina Baghai Riding
- Awarded tenure
- Published a book review in Plant Science Bulletin
- Presented a poster for the Association Southeastern Biologists
- Awarded a 4H and Chevron Community Pride Grant concerning Mississippi Delta ice-age fossils.
- Received grant from the Army Core of Engineers to investigate the presence of Japanese knotweed in soil cores from Rhode Island.
- Received from Bryce Griffis grant for work on the Japanese knotweed project
- Involved seven undergraduate students in palynological research projects and on the Japanese knotweed study. They made figures, helped process samples, entered data, made microscope slides. They also mounted over 200 plant specimens for the DSU herbarium.

Jeff Duguay
- Presented two research reports, aided by undergraduate students, at Association of Southeastern Biologists: ELLIOTT, JOHNATHAN, JANEAN WINTERS, AND JEFFREY P. DUGUAY. Habitat use by marbled salamanders at Dahomey National Wildlife Refuge and DUGUAY, JEFFREY AND CHERYL FARFARAS. A four-year investigation of plant and invertebrate response to management of an overabundant suburban deer population in Maryland.
- Gave presentation on White-tailed deer habitat management for the Mississippi State University Extension Service and Bolivar County Soil & Water Conservation District 4-II “After the Hunt” Wildlife Jamboree
- Has had a manuscript, Wood, P.B., and J.P. Duguay. Cerulean warbler use of regenerated clear-cut and two-age harvests,” accepted for publication in the Wildlife Society Bulletin.
- Is continuing the salamander research at Dahomey National Wildlife Refuge.

Sam Faulkner
- Supervised planting 108 new trees in at the Center for Science and Environmental Education (CSEE) in Merigold. We now have over 200 trees on that project.
- Dr. Faulkner and Sudbrink plan to do a GPS-map of the CSEE and inventory the tree species there.
- Received Brice Griffis grant to begin digitizing and creating a database of the 13,000 specimens housed in the Delta State University Herbarium.

Chuck Smithhart
- Presented research findings at the Mississippi Academy of Sciences meeting along with graduate student Nick Phillips: "Diffuse Reflectance Infrared Fourier Transform Spectroscopy (DRIFTS) On Mineral Additions To JSC Mars 1 Simulant Soil”
- Began a study, along with an undergraduate student, to investigate the electrochemical synthesis of poly-n-vinyl carbazole, a photoconducting polymer that might have application in the area of detecting ultra-soft x-rays.
- Served as chair of the University Research Committee
- Help organize the first DSU Research Week entitled "May We Present?"
- Participated in a study, along with Mark Steele: "Principals Perceptions of Student Achievement Test Scores in the Mississippi Delta," presented Fall 2004 at the Quarterly NSF/Evaluative Research Capacity Building (ERCB) meeting in Biloxi, MS.
Rie Somlai

- Revived the Principles of Pharmacology course for our Pre-Pharmacy majors.
- Introduced a new course in Polymer Science.
- Presented research on *Oxidation of Lignin-Based Chemicals for Use as Thermoset Resin Monomers* at an International Meeting of the American Chemical Society.
- Attending an National Science Foundation workshop during Summer 2005 on Green Chemistry Organic Laboratory Experiences at the University of Oregon.
- Attending a Chautauqua workshop in Des Moines, Iowa during Summer 2005 entitled "How to teach like a Pro."
- Presented a poster at "May We Present?" DSU Research Week
- Is supervising the purchase and installation of our new 300 MHz JEOL nuclear magnetic resonance instrument (NMR) supported through a National Science Foundation grant.

Joe Bentley

- Presented a poster, *The Accurate Calculation of Ro-Vibrational Eigenenergies of HN2Cl4N* at the 13th Annual Conference on Current Trends in Computational Chemistry. This research as assisted by a graduate student.
- Presented a seminar entitled *The Accurate Calculation of Ro-Vibrational Eigenenergies of Triatomic Molecules*, at the University of Southern Mississippi
- Presented a seminar entitled *The Accurate Calculation of Ro-Vibrational Eigenenergies of Hydrogen Cyanide*, at the annual meeting of the Mississippi Academy of Sciences
- Presented a research poster at the DSU Research Week event, "May We Present?"

Don Sudbrink

- Submitted a manuscript for publication *Remote Sensing of selected winter host plants of tarnished plant bug (Heteroptera: Miridae) and the effect of burn-down herbicide on the hosts and arthropod populations* to Environmental Entomology.
- Published research paper entitled *Digital imaging from agricultural aircraft: System configurations and constraints for integrated pest management, weed detection, and determination of crop status* in Proceedings of the 18th Biennial Workshop on Color Photography and Videography in Resource Assessment, American Society for Photogrammetry & Remote Sensing
- Published a research paper entitled *Remote-Sensing Measures of Cotton Maturity - Cutout and Boll Opening* in Proc. Beltwide Cotton Conference.
- Published a research paper entitled *Evaluation of remote sensing to identify variability in cotton plant growth and correlation with larval densities of beet armyworm and cabbage looper (Lepidoptera: Noctuidae)* in Florida Entomologist.
- Made a presentation entitled *Tri-trophic goldenrod-gall insect communities in the Mississippi Delta: Influence of Landscape* at the Association of Southeastern Biologists. The project was aided by a DSU undergraduate student.
- Made a presentation entitled *Biodiversity inventory of Arthropods of Dchomey & Tallahatchee National Wildlife Refuges* at the Association of Southeastern Biologists. The project was aided by a DSU undergraduate student.
- Displayed two presentations at the DSU Research Week event "May We Present?"

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• Involved students of Entomology class in biodiversity inventory project at Dahomey & Tallahatchee National Wildlife Refuges.
• Received Technology Champion Award for 2004-2005 to pursue a project on "Digital Imaging of Invertebrates & Plant Pathogens for E-learning"
• Serving on Research & Education Committee of the Friends of Dahomey National Wildlife Refuge.
• Made a presentation on research activities to Lion's Club, Cleveland, MS
• Made a Presentation on Applied Ecology to AAUW chapter, Cleveland, MS
• Revised Plant Pathology course

New and revised courses
• Wildlife Techniques, Summer 2005, taught by Jeff Duguay
• Principles of Pharmacology, Spring 2005, taught by Rie Somlai
• Introduction to Polymer Science, Fall 2004, taught by Rie Somlai
• Ornithology, Spring 2005, taught by Jeff Duguay
• Plant Pathology, Spring 2005, taught by Don Sudbrink
• Introduction to Wildlife Management, Fall 2004, taught by Jeff Duguay

Unit Goals

Ongoing and new goals of the division have been formulated as they relate to the mission of the University and its goals. Current departmental goals stem from a commitment to achieving the University mission. Generally stated these goals include:

Review and update undergraduate and graduate programs to adequately address basic skills, knowledge, and competencies necessary for students to be properly prepared in their chosen fields, to complete licensure requirements, enter the work force, and/or continue advanced study in graduate or professional school.

Accommodate non-traditional students and the general public by offering a comprehensive program of continuing education, including off-campus classes, independent study courses, non-credit courses, conferences, and workshops.

Increase and improve the use of instructional technologies in support of the education process.

Enhance educational experiences at all levels by encouraging student and faculty research and other creative work.

Support interdisciplinary centers that contribute to our regional mission.

Pursue outside funding opportunities.

Specific unit goals
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.

**Relationship to University goals**

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.

**Assessment**

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.

**Outcomes**

- As of 2004-2005, three “smart” classrooms were in operation, Caylor 105, Caylor 147, and Walters 174. These rooms, along with several portable projectors have helped increase access to technology-enhanced learning.

- There are plans to increase technology access during 2005-2006 by adding data projection/Internet access in three more lecture rooms in Caylor-White and Walters Halls.

- 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.

- Aging microscopes need to be replaced in several biology laboratories.

- “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.

Relationship to University Goals

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.

Assessment

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.

Outcomes

- 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.

Relationship to University goals

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.

Assessment

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.

Outcomes

- 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.

**Goal 4.** 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.

Relationship to University Goals

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.

Assessment

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.

Outcomes
• 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.

Goal 5. Develop a plan for the renovation and possible expansion of the physical facilities of Caylor-White and Walters halls, emphasizing primarily modernization of laboratory and instrumentation facilities, but also focusing on improved utilization of space and technology for state-of-the-art instruction. As of Fall Semester 2005, the planning stage for this renovation project has been funded and is underway. The faculty are now working to enumerate and describe all needed changes and improvements in a specific manner, working with the College of Arts and Sciences on a renovation plan that can be brought to realization.

Assessment

By the end of 2005-2006, the Division should have a renovation plan in place, created in consultation with the architects hired for this project.
Needs and Requests

The division proposes the following recommendations and requests in response to existing demands to meet our vision of excellence in education of science majors and in the science component of general education. The University is asking that we place greater emphasis on student engagement. We have expanded our efforts to secure external funding through increased involvement in development activities and in grant writing. These new pressures are redefining the traditional roles of faculty at Delta State University and in the Division of Biological and Physical Sciences. The following recommendations summarize the attention that needs to be given to the division if we are to continue meeting “both” existing and new goals.

1. Enhance support of the division so that it may attain the goal of becoming truly excellent and a standard against which other university science departments are measured. Expand the division budget to assure adequate laboratory instructional equipment, field experiences, and other program needs and resources.

2. Support a new definition of the “full load” to include provision of release time for individual faculty to pursue scholarly activity, community and university service functions, and support of student research. Provide this incentive to division faculty who desire to embrace the institution’s expanded emphasis on research, grant writing and development activities, community engagement and service, and other outreach functions.

3. Endorse the CSEE as the science education outreach function of the university and the recommendation to umbrella all science education programs under the CSEE for the benefit of the University, Delta science teachers, their schools, and their students.

4. Provide improved funding mechanisms dedicated to acquisition, maintenance, and replacement of equipment, technology, and other programmatic needs.