

# Biological Science Degree Program Five-Column Model for 2004-2005

## Statement of Institutional Purpose

### *Mission Statement*

The Biology Department maintains a highly educated, philosophically and culturally diverse faculty in order to...

### *Goal Statement*

Provide our students with quality lecture, laboratory, and field instructional experiences which foster student inquiry into science, and prepare them for post-baccalaureate pursuits.

## Program Intended Outcomes & Objectives

1. Students will demonstrate an understanding of the dynamics of interactions and adaptations within biological systems, and a general knowledge of biology; its language, methodologies, findings and applications.
2. Students will be able to communicate effectively in oral and written formats.
3. Students will be able to use appropriate tools to carry out investigations in their intended field.
4. Students will be involved in regional service partnerships.
5. Students will be prepared for post-baccalaureate plans

## Means of Program Assessment and Criteria for Success

1. Graduates taking the senior major biology (ETS) field exam will be at or above the 50th percentile compared to national results with no subscale score below the 30th percentile.
2. Course embedded activities will require students to demonstrate their levels of learning, skills, and communication using departmental criteria:
  - a. By the end of each semester course, students will score a minimum of 70% on departmental rubrics for writing scientific papers, oral presentations, and critiquing peer-reviewed journal articles where appropriate.
  - b. Students in all 3000 level organismal courses and 4000 level capstone courses will demonstrate their understanding of the vocabulary of biology by reading and critiquing at least one primary paper.
  - c. At least 50% of biology majors will present original research in department symposia
3. At least 50% of biology majors will participate in undergraduate research, service learning, cooperative education, and/or internships.
4. At least 50% of students and faculty will participate in a student-faculty focus group each semester, to address issues of advising, grading, curriculum and retention. Results of focus group will be used to develop a strategic plan for the department in subsequent faculty meetings. Meeting results and subsequent responses will be posted for students in the science building hallways, on the department web-page, and in the school newspaper.
5. Ongoing advisory committees will review programs and ensure relevant curriculum opportunities (e.g., industry contacts and community members for biology, faculty committee to assess preparedness for medical-related field, teaching observations for teaching majors, undergraduate research oversight committee.). The department will solicit an external review of biology programs from another regional university of similar size.
6. Student and Peer Teaching evaluations will rate faculty at 80% or greater for overall teaching effectiveness.
7. A graduate exit survey and an alumni survey will be conducted at intervals post-graduation, 1, 5, and 10 years. 75% of biology graduates will indicate on the Exit and Alumni surveys that their biology program was effective in preparing them for post-baccalaureate plans

## Summary of Data Collected

1. On the ETS biology field exam, 2005 SUU biology graduates (n=63) scored a mean scale score of 152, range 133-176, ranking in the 45th percentile of all institutions taking this exam from 2000-2003. 22 of these graduates had at least one subscale score below 30<sup>th</sup> percentile.
2. Levels of Learning, skills and communication:
  - a. In all appropriate upper division courses, students scored > 70% on departmental rubrics for writing scientific papers, oral presentations, and critiquing peer-reviewed journal articles (see syllabi criteria for courses BIOL 3270, 3280, 3470, 3490, 4310)
  - b. All students in the 3000 level organismal courses: Entomology, Ornithology, Plant Physiology, Herpetology / Ichthyology, Cell Biology, Vertebrate Physiology, and 4000 level capstone courses: Biotechnology, History and Literature of Biology, Animal Behavior demonstrated their understanding of the vocabulary of biology by reading and critiquing at least one primary paper (see syllabi criteria for course requirements)
  - c. 404 biology majors presented original research in class, department and University symposia: Biology 2 (218 students), Ecology (99 students) Vertebrate Physiology (44 students), Biology symposium (38 students), University Scholarship Day (5 students)
3. 94 Students registered for undergrad research, coop ed, internship credit; in addition all 343 students enrolled in Conservation Biology (37), General Ecology (99 students), Invertebrate Biology (30), Animal Behavior (24), Cell Biology (21) Biotechnology (13), Bioinformatics (5), Biology 2 ( 218), participated in undergrad research and /or service learning projects.
4. A college of science student-faculty focus group was conducted by the student senate both fall and spring semester. Many Biology students and faculty participated, however, there are no statistics available on the level of participation. The biology department also conducted biology major student-faculty focus group meetings at the end of Fall semester. Students who attended were concerned about course offerings, and advisement problems. In addition, the graduate exit survey included opportunities for graduating seniors to address issues of advising, grading, curriculum and retention.
5. Ongoing committees continue to meet and review programs and ensure relevant curriculum opportunities (e.g., industry contacts and community members for biology, faculty committee to assess preparedness for medical-related field, teaching observations for teaching majors, undergraduate research oversight committee.). As part of a Visiting Scholar program and Workshop on Successful Teaching Strategies, Visiting scholars were asked to informally review our biology programs. Both scholars (Marvin Druger, Syracuse University and Connie Russell, San Angelo State University- a regional university of similar size) rated our programs as strong in all areas.
6. Fall and Spring semester Student and Peer Teaching evaluations rated biology faculty at 86% for overall teaching effectiveness (Fall '04 = 87 %: n=1017, Spring '05 = 86%: n=1161, Overall Avg = 86%). Scores for all questions on student evaluations were >86%, except for giving feedback about assignments (82%).
7. In the 2005 graduate exit survey, 63 graduates rated 88% of the courses they had taken in their program as Useful or very useful for post-baccalaureate plans (40 out of the 45 courses). The graduates also said that on average their coursework was useful or very useful in meeting all the departmental objectives with 2 exceptions. Many students had coursework with little or no applications of math and statistics, and little or no service learning opportunities. No alumni survey was conducted.

## Use of Results

1. Exit Exam: Pertinent information has been communicated to appropriate faculty as well as considered more broadly in departmental forum as part of the ongoing dialog regarding content area flow. In 2004-2005, the information was used to revise the scope and sequence of the Cell Biology General Biology 1 course. In 2005-2006 the scope and sequence of Biology 2 will be revised.
2. Continuing in 2005-2006, beginning Biology 2 students will be in cohorts working on study skills in the College of Science UNIV 1000 course for specific biology assignments using the departmental rubrics for levels of learning skills and communication. It is hoped that this will continue to strengthen their skills and success.
- 3 and 4. Although the number of our students participating in undergraduate research, service learning, cooperative education, and /or internships continues to increase, the faculty also continue to add opportunities in all courses and independent study for our students. The department appointed an undergraduate research committee in 2004-2005, to explore ways to strengthen this experience. The two faculty hired for the 2005-2006 school year are committed to bring additional research opportunities for undergraduate research.
5. Biology Faculty will continue to use the exit survey information to refine the strategic plan for the department in subsequent faculty meetings for 2005-2006. Meeting results and subsequent responses will be announced or appropriately posted for students in the science building hallways, and on the department web-page.
6. The pre-professional committee communicates informally with colleagues on changes in admission requirements to professional schools and gains insights on student preparation by a thorough review each candidate's application credentials. Specific content requirement changes are brought to the departmental forum. After each pre-professional student interview, the committee discusses strengths and weaknesses of each candidate in purview with his or her demonstrated levels of learning, skills, and communication acquired through the biology curriculum and associated experiences. The biology teacher education advisor uses student teacher observations to reflect upon areas which might need greater emphasis in the methods course.
7. Interested biology faculty will continue weekly peer teaching meetings. Each faculty person has developed a specific teaching goals; a peer evaluation form and schedule has been developed to evaluate each participating faculty member.
8. The Exit Survey and Assessment Plan will be modified by the 2005-2006 assessment committee and approved by the biology faculty in the Fall 2005, using information from student survey, exit exam results, and advisory committee reports. In 2005-2006, the College of Science advisor will collect alumni survey information in collaboration with the alumni office.